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A CONSPIRACY OF SILENCE

ONE EQUITABLE SOLUTION

GENEVA-TOKYO-CHINA-MANCHOUKUO

THE INDEPENDENT STATUS OF MANCHOUKUO

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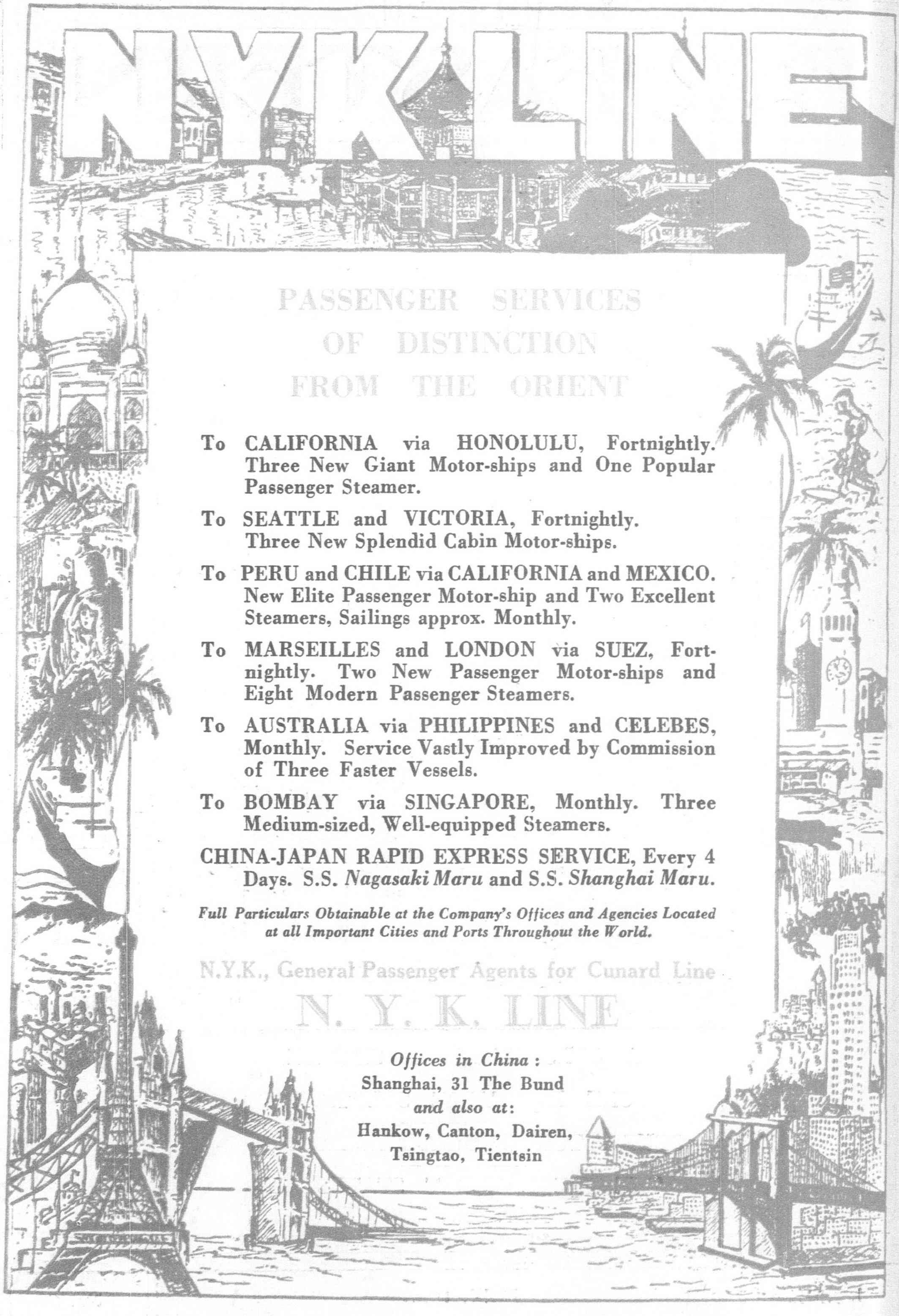

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VOL. XXIX SHANGHAI, JUNE, 1933 No. 6

A Conspiracy of Silence

Japan Has Been Tried and Condemned by the Suppression of Vital Evidence

By GEORGE BRONSON REA

On November 12, 1921, the Chairman of the Washington Conference (Secretary of State Charles Evans Hughes), said that he had received from the Chinese Delegation a telegraphic summary of the secret Treaty of Alliance between China and Russia concluded in May, 1896, which had been received by the Chinese Delegation from Peking. The Chinese Delegation added that they would send a copy of the full text of the treaty **as soon as it was received.** The telegraphic summary in French and in English, was submitted to the Committee for the purpose of being reported to the Conference. He then read the English summary.

Although reference to this Treaty had been made in various publications and memoirs, this was the first official admission on the part of either High Contracting Party that it had actually existed. So well had the secret been guarded, that the Open Door Doctrine had been subscribed to by the Powers, the Russo-Japanese War fought and peace signed by Japan in utter ignorance that the Treaty existed.

There is no statute of limitations to the acts of a nation. When China confessed to the existence of the Treaty in 1921, fifteen years after the Russo-Japanese War had been fought, she became legally and morally liable for any indemnity that Japan might claim. That Japan has not availed herself to date of this privilege does not invalidate her claim, for the simple reason that the full text of the Treaty has never been revealed. Until the full text in the original language is released by the American Government as an official document of the Washington Conference it cannot be quoted as evidence. Only a few Americans interested in these problems have official and legal confirmation of the existence of this Treaty and of its full text. The rest of the world remains in ignorance. Even the League of Nations has no official knowledge of its existence. The following brief reference appears in the Report of the Commission of Enquiry :—

> " In 1896, a secret defensive alliance was concluded between the two countries and in the same year, in consideration of the services above referred to, Russia was authorized by China to carry a branch of the Trans-Siberian Railway across Manchuria in a direct line from **Chita** to Vladivostok. This **line was said to be needed** for the transportation of Russian forces to be sent to the East in case Japan should again attack China. The Russo-Chinese Bank (later the Russo-Asiatic Bank) was established to **mask** somewhat the official character of the enterprise. . . . ." (Italics are my own. G.B.R.)

The wording of the above is clear evidence that even the League Commission of Enquiry was uninformed of the full text of the Treaty. The object of the Railway is plainly defined in Clause IV. Had its text been available to the Commission, it would have been quoted in full. Furthermore, had the existence of this Treaty been legally established by the publication of its full text as part of the Records of the Washington Conference, the League Commission as an impartial body, would not have failed to invite attention to its bearing on subsequent events and especially on the dispute between China and Japan over Manchuria, nor would it have been so solicitous for the interests of Russia.

Case at Geneva is Closed

The Commission's Report goes on to describe the events leading up to the Russo-Japanese War and the Peace of Portsmouth, but makes no further reference or comment on the Secret Treaty which admitted the Russian army into Manchuria to " defend China against Japan." The Commission's report has been accepted as final. The League refuses to reopen the case or admit any evidence which might compel revision of its verdict.

There are certain legal facts that the Report ignored. **The Treaty was signed.** China and Russia were allied against Japan. Although disguised as defensive, the Treaty clearly signifies hostility and aggression against Japan. **It was never denounced. It accomplished its purpose.** No matter what Russia did after she gained entrance into Manchuria, the indisputable fact remains that China faithfully carried out her part of the bargain. China dared not openly denounce the Treaty without inviting the immediate hostility of Japan and Great Britain and bringing down upon her the vengeance of Russia. She remained silent while John Hay, ignorant of the existence of this pact, induced the Powers to subscribe to the Open Door Doctrine carrying with it a guarantee of China's territorial integrity and sovereignty at the very time she had surrendered her territory to Russia in order that the armies of the latter could entrench themselves along the Korean frontier. Japan subscribed to the Open Door doctrine without reservations, the only Power that came out frankly and honestly in support of American policy. Yet in subscribing to these principles, she unwittingly bound herself to respect the sovereignty of China at the precise time that China and Russia were sharpening their swords in preparation for her undoing.

The inevitable clash came in 1904. Japan fought for her existence, not against China but against the then most powerful military nation of the world. Japan lost 100,000 men killed in action and another 100,000 or more were wounded. She nearly bankrupted herself to carry on the struggle and went to Portsmouth buoyed up by the hope that she would be paid an indemnity. In the interests of peace and in ignorance of the existence of the secret treaty of alliance, Theodore Roosevelt prevailed upon Japan to forego a cash indemnity and restore Manchuria to China. On learning of the peace terms, the people of Japan held the United States responsible for the loss of the indemnity and the intense feeling of disappointment and resentment gave rise to violent anti-American demonstrations.

An Opportunity that Passed

Not until the Washington Conference did the dumbfounded Japanese realize how they had been miserably duped and buncoed out of an indemnity or a cession of territory that would have compensated them for their sacrifices. For reasons of their own, they declined to comment on the confession of China when the telegraphic summary was handed in. The British Delegates had the opportunity to point out that the Russo-Chinese Treaty of Alliance forced the Anglo-Japanese pact and justified their own policies, then under fire. The British deserted their old and tried

Secret Treaty of Alliance of Russia and China Against Japan (1896-1911)

A.—Telegraphic summary, furnished by China and read by Secretary of State Hughes at the February 6, 1922, session of the Washington conference.

B.—Complete text, though unofficial, from MacMurray, p81, tacitly endorsed by the State department as an "unofficial copy of the French text," a copy of which was filed in Washington by China several years after the conference. MacMurray's text is from an article in the *London Daily Telegraph*, February 15, 1910, by "An Admirer of Li Hung Chang."

"A" AND "B" TREATY OF ALLIANCE BETWEEN CHINA AND RUSSIA—MAY 1896.

ARTICLE I.

A.—The High Contracting Parties engage to support each other reciprocally by all the land and sea forces at any aggression directed by Japan against Russian territory in Eastern Asia, China or Korea.

B.—Every aggression directed by Japan, whether against Russian territory in Eastern Asia, or against the territory of China, or that of Korea, shall be regarded as necessarily bringing about the immediate application of the present treaty. In this case the two High Contracting Parties engage to support each other reciprocally by all the land and sea forces of which they can dispose at that moment, and to assist each other as much as possible for the victualling of their respective forces.

ARTICLE II.

A.—No treaty of peace with an adverse party can be concluded by either of them without the consent of the other.

B.—As soon as the two High Contracting Parties shall be engaged in common action, no treaty of peace with the adverse party can be concluded by one of them without the assent of the other.

ARTICLE III.

A.—During military operations all Chinese ports shall be open to Russian vessels.

B.—During the military operations all the ports of China shall, in case of necessity, be open to Russian warships, which shall find there on the part of the Chinese authorities all the assistance of which they may stand in need.

ARTICLE IV.

A.—The Chinese Government consents to the construction of a railway across the Provinces of Amur and Kirin in the direction of Vladivostok. The construction and exploitation of this railway shall be accorded to the Russo-Chinese Bank. The contract shall be concluded between the Chinese Minister at St. Petersburg and the Russo-Chinese Bank.

B.—In order to facilitate the access of the Russian land troops to the menaced points and to ensure their means of subsistence, the Chinese Government consents to the construction of a railway line across the Chinese provinces of the Amur (Heilungkiang) and of Guirin (Kirin) in the direction of Vladivostok. The junction of this railway with the Russian railway shall not serve as a pretext for any encroachment on Chinese territory nor for any infringement of the rights of sovereignty of His Majesty, the Emperor of China. The construction and exploitation of this railway shall be accorded to the Russo-Chinese Bank and the Clauses of the Contract which shall be concluded for this purpose shall be duly discussed between the Chinese Minister in St. Petersburg and the Russo-Chinese Bank.

ARTICLE V.

A.—In time of war, Russia shall have free use of the railway for the transport and provisioning of her troops. In time of peace Russia shall have the same right for the transit of her troops and provisions.

B.—It is understood that in time of war, as indicated in Article I, Russia shall have free use of the railway mentioned in Article IV, for the transport and provisioning of her troops. In time of peace, Russia shall have the same right for the transit of her troops and stores, with stoppages which shall not be justified by any other motive than the needs of the transport service.

ARTICLE VI.

A.—The present treaty shall come into force from the day on which the contract stipulated in Article IV, shall have been confirmed. It shall have force for fifteen years.

B.—The present treaty shall come into force on the day when the contract stipulated in Article IV, shall have been confirmed by His Majesty, the Emperor of China. It shall have from then, force and value for a period of fifteen years. Six months before the expiration of this term, the two High Contracting Parties shall deliberate regarding the prolongation of this treaty.

Ally at this moment and the American Secretary of State hastily closed the incident by turning to another subject before the Conference. Everybody was looking out the window admiring the scenery along the Potomac when the evidence that justified Japan was read out in open Conference. The Japanese are still awaiting official confirmation of the existence of the Treaty by the publication of its full text.

The printed Report of the Washington Conference does not include the full text of this Treaty, which indicates, either that it was not received in time for publication or, that it was suppressed by the editors of the Report. That it has not as yet been released, gives rise to the following pertinent questions:

1. Did the Chinese Delegation comply with its promise to send a full text of the Treaty **as soon as it was received ?**
2. If so, on what date was the full text received ?
3. If the Chinese did send in the full text of the Treaty, **why has it not been made public as part of the Records of the Washington Conference ?**

Although the State Department as the Repository or Guardian of the documents of the Washington Conference may technically have no obligation to transmit documents received subsequent to its termination, failure to do so might easily be construed by Japan as evidence of a desire to conceal its sinister character.

If subsequent indiscreet revelations, such as "The American Black Chamber" can be relied upon as accurate, the Washington Conference was first proposed by Great Britain in order to bring about the termination of the Anglo-Japanese Alliance and its real objective was then screened by calling a Conference for the Limitation of Armaments and a settlement of China's problems by negotiating a new Treaty giving effect to American policies. Had the Chinese Delegation handed in the full unabridged text of the Secret Treaty of Alliance, the Conference would have been compelled to face facts that would have made impossible any peaceful solution of the problems under discussion without recognizing Japan's legitimate claims to an indemnity from China. That the Conference terminated successfully is due in large part to the suppression of evidence that would have defeated its aims. American diplomacy scored at the expense of Japan.

Private inquiries addressed to the State Department have elicited the information that the Chinese did comply with their promise **(but no date is given)** and, that an unofficial English translation of the French text will be found on Page 81 of "*MacMurray's Treaties and Agreements with and Concerning China.*" This compilation of documents, issued just prior to the Washington Conference, reproduced the Treaty from an article appearing in the London *Daily Telegraph* of February 15, 1910, written by an "Admirer of Li Hung-Chang." This version, however, cannot be accepted as official. The Treaty in its original language still remains a well guarded secret.

A Case of Careful Editing

Accepting, however, that the above mentioned unofficial English translation of the document filed by the Chinese Delegation is authentic, comparison of the telegraphic summary with the full text betrays the reason why it was carefully edited before handing it in to the Conference and why the Chinese Delegation delayed complying with their promise to file the full text until long after the official Report of the Conference had been printed and distributed.

A few days previous to filling the telegraphic summary, the Committee on the Chinese Eastern Railway submitted its Report and Resolutions basing their conclusions on the Commercial Convention of September, 1896. The full text of this Treaty signed in May, 1896, clearly establishes the purposes and objects of the Chinese Eastern Railway (and its South Manchuria branch) as a military weapon designed to facilitate the transport of the Russian armies to the **"menaced points on the (Korean) frontier" and for their subsistence,"** and reveals that the Commercial Convention of September, 1896, was merely the screen which concealed the real purpose of the line. When the existence of this Treaty is legally established, the Chinese Eastern Railway Convention and all subsequent agreements concerning the operation and management of the line are invalidated.

It is common knowledge that the French Government is pressing the claims of the Russo-Asiatic Bank against the Chinese Eastern Railway for a sum considerably in excess of its actual cost of construction. These claims derive their legitimacy from the provisions of the Commercial Convention of the Chinese Eastern Railway of September, 1896. As long as the legal existence of the Master Treaty is not established, the claims of the Russo-Asiatic Bank rest on a solid foundation but the moment the full text of the Master Treaty is published as an official document, the French Government must admit either that it knowingly financed the line as a military instrument directed against Japan, thus becoming a third party to the secret alliance, or, that her Russian Ally maintained her in ignorance of its pact with China. The validity of the French claims rests upon a contract deliberately designed and made public at the time in order to conceal the existence of a military alliance which came into force on the signing of the contract.

Diplomatic Reticence

Failure on the part of the Chinese Delegation to comply with its promise to file the full text of the Treaty until long after the Conference was terminated and the Report of its proceedings published, implies that they were anxious to keep the truth out of the records. **Chinese secret diplomacy again scored.**

When the full text of this Treaty is published as an official document of the Washington Conference, should the Japanese Government ask Washington the following questions; what would be its reply ?

1. Had John Hay known of its existence in 1898 would he have invited the Powers to subscribe to the Open Door Doctrine ? Would he have asked Japan to adhere to principles that bound her to respect the sovereignty and territorial integrity of China at the precise time that China had handed over her territory to Russia in order that the armies of the latter could get into position to fight Japan ?
2. Had Theodore Roosevelt known of the existence of the Treaty would he have invited Japan and Russia to the Conference Table at Portsmouth and used his influence to induce Japan to forego a cash indemnity and restore Manchuria to China ?
3. Had the Japanese Delegation to the Washington Conference requested that the full text of this Treaty be communicated to the Conference and then demanded a reopening of the whole Manchurian question based on this confession, could the Nine Power Treaty have been signed ?
4. The Japanese Government, might with equal propriety, ask the French Government if it knew of the existence of this Treaty when it sanctioned the loans to Russia for the construction of the Chinese Eastern Railway ?

That the Japanese Delegation did not take advantage of the opportunity at Washington to reopen the whole Manchurian question, was due to the fact:

First, that their Government had accepted the invitation to attend the Conference on the condition that its rights and position in Manchuria should not come up for discussion, and Second, that they sincerely desired to facilitate the high aims and objects of the Conference looking forward with faith and hope to a new era of peace in the Pacific and to a new understanding with China in which the past would be buried and forgotten.

For the last two decades the whole trend of Chinese diplomacy, publicity and propaganda has been to embroil the United States in a war with Japan. Chinese statesmen openly declare that the United States must fight Japan; that we are in honor bound to uphold our position by force; that we cannot shirk our duty. The publication of the full text of the Secret Li-Lobanoff Treaty of Alliance in its original language will disclose that the policies we are expected to go to war to uphold were formulated at the precise time that China was a full partner with Russia in provoking a war with Japan. The American people are now asked by the statesmen of China to go to war with Japan in defense of policies and treaties whose existence and binding power was made possible through the sacrifices of Japan and her unwillingness to date to press an advantage that any Western Power would have used to advance its interests.

One Vital Document Overlooked

The League and the United States have judged and condemned Japan squarely on their own interpretation of the Treaties, yet the most vital document bearing on the whole complex Far Eastern problems remains closely guarded in the archives of the American State Department. Too proud to admit her mistakes or explain her position and unwilling to embarrass the American Government by requesting it to release a document that should long ago have been published as part of the Records of the Washington Conference, Japan has also discarded the legalities and is standing pat on her own conception of justice. All other Treaties bearing on the problems of Manchuria have been invoked and searched carefully to make out a case against Japan, but it seems to be tacitly agreed that the one document that establishes her rights to Manchuria shall not be given legal sanction by its publication. Is it not time for Americans to ask themselves where their diplomacy is leading the nation ?

Can we deny that the American Open Door Doctrine was promulgated in complete ignorance of the existence of this Treaty ; that it bound Japan to respect the sovereignty and territorial integrity of China at the precise time that this Treaty, breathing aggression and hostility against Japan, was in full force ; that after fighting a victorious war with Russia an American President prevailed upon Japan to forego a cash indemnity and to restore Manchuria to China ; that the Nine Power Treaty was made possible by Japan's forbearance and refusal to break up the Washington Conference by demanding a reopening of the whole Manchurian dispute ; that another American President enunciated a new Doctrine declining to recognize the independence of Manchoukuo because, in his opinion, it was created as the result of force applied by Japan ; that the League of Nations has accepted the Hoover Doctrine as its own and drafted resolutions which if enforced in practice, may create a situation that may lead us into a war in the Pacific. In view of these facts, is it not time for Americans to try and understand Japan's viewpoint and live up to the slogan of the New Administration by giving her a New Deal ?

By every known and established rule of warfare, Manchuria should belong to Japan. She emerged the victor from two wars fought for its possession. Bludgeoned out of the fruits of her victory over China by the then three most formidable military powers of the world ; buncoed like a rube out of a cash indemnity at Portsmouth by reason of China's secret diplomacy ; thwarted during the Great War from establishing her security in Siberia after the Allied Supreme War Council had voted to concede her a slice of territory for keeping the Trans-Siberian line open ; compelled to restore Shantung to China ; her late Allies are once more solidly lined up behind the League supporting China in her long drawn out fight to escape the consequences of her secret diplomacy of 1896 ! Is it any wonder that the Japanese Army has defied the rest of the world to oust them from Manchuria ?

They remember the past. They saw the last fruits of their victories being taken away from them by a new type of warfare legalized by the treaties. Slowly but surely they were being driven out of Manchuria. Their backs were against the wall, their feet held fast in a treaty-trap while the Chinese had slung a noose around their neck and were slowly strangling them to death. The other Powers looked on and approved and when Japan broke out of the trap, they condemned her for breaking the law !

The Russo-Japanese War has cost Japan to date nearly five billion gold dollars. Add to this, her billion dollar investment in Manchuria and the half billion that Korea has cost her to safeguard her security, and the total is over six and a half billion dollars! The Japanese people are still paying for the war that was forced upon them by China. **They have paid enough !** It is time the account was settled.

The American Government has a duty to perform. As the Custodian of the Documents of the Washington Conference it should immediately release the full text of the Secret Treaty of Alliance between China and Russia of May, 1896, establish it as a legal document and, in view of its provisions ask itself whether or not it has been fair to Japan all these years. The success of American policy in the Far East has been made possible by the sacrifices of Japan. Let us make the **amende honorable,** set aside the Hoover Doctrine and extend recognition to the new State of Manchoukuo as soon as it merits such recognition. If we are to have Peace in the Pacific, it is the only way.—G. B. R.

One Equitable Solution

The Question of Indemnities

CHINESE diplomacy at Geneva was directed towards having Japan declared the "aggressor" as the first step in demanding a huge indemnity that would cover the value of lives lost and property destroyed in Chapei, Manchuria and North China. The decision of the League to support the Hoover Doctrine of Non-Recognition and the measures now being recommended to implement that doctrine may give rise to incidents that cannot be settled by peaceful methods. The League refuses to face the realities. The new State of Manchoukuo exists. It functions. It has come to stay. It will fulfill its mission and bring peace and security not only to Japan but to China herself. The decision of the Soviet Government to sell the Chinese Eastern Railway ushers in a new era in the Far East. The spread of Communism has been checked. The Red wave has been pushed back into Central Asia. The menace from the direction of Urga has disappeared. The creation of Manchoukuo has accomplished a task that the League, the Nine Power Treaty and the Peace Pacts were unable to achieve.

The thirty million people of Manchoukuo have resorted to the doctrine of self-determination and resumed an independence that was broken at the time of the Chinese Revolution. The world deludes itself that this independence was forced upon the people of Manchoukuo as the first step towards the ultimate annexation of their territory by Japan. But the people of Manchoukuo are not worried about their future. They are confident that Japan will live up to her promises and are willing to join with and cooperate with her in establishing the peace and security of Eastern Asia. They look forward to a future filled with promise, of progress and prosperity.

Japan has announced to the world that she does not want Manchuria ; **"she would not take it as a gift."** If for no other reason than the expense involved, Japan will never make a second Korea out of Manchoukuo. The annexation of Korea has cost Japan to date nearly a billion gold yen ; the price she was forced to pay in order to keep pace with Imperial Russia's program to resume the war of 1905, **which Count Witte in his memoirs confesses was scheduled to take place in 1912.**

China and Russia entered into a secret alliance in May, 1896, directed against Japan, which handed Manchuria over to Russia in order that strategic railways could be built to facilitate the transport of the Russian armies to the "**menaced points on the Korean frontiers.**" The Russo-Japanese war could never have been fought if Manchuria had not been occupied by the Russian armies and its ports transformed into naval bases under the terms of this alliance.

An Unpublished Document

It is a remarkable fact that after filing the telegraphic summary of this secret treaty at the Washington Conference, the full text was not published in the official report of that Conference. Either it was not received in time to be included in the printed Report of the Proceedings of the Conference, or it was omitted from the record by the editors as a document of no consequence. Yet this Secret Treaty of Alliance between China and Russia of 1896 was the Key to the Chinese Puzzle, the missing link in a series of treaties that clarified and explained the events that followed. The way in which this vital historical document has been treated by diplomats, and publicists is not only a reflection on their intelligence, but almost invites the charge of insincerity in dealing with Far Eastern problems. The mere filing of the incomplete telegraphic summary disclosed amongst other things that American policy towards China was based on a complete ignorance of essential facts, revealing John Hay and Theodore Roosevelt as the dupes of China in formulating and applying their policies.

After filing the summary, Chinese diplomats have declined to discuss or comment upon its provisions.

Unofficially and in private conversation, they evade responsibility for its consequences by urging that the alliance was automatically cancelled in 1900 when Russia joined the Allies in the march on Peking or, that the treaty was never formally ratified by the Throne. That Russia betrayed her Ally is true, but China carried out her part of the pact and never dared reveal the existence of the treaty by publicly denouncing it. Formal ratification was rendered superfluous by its final clause which provided that it came into force on the day the railway contract was signed. This was signed four months later. The first and only official statement of the Chinese Government concerning the treaty since the date of filing with the Washington Conference the telegraphic summary of its text, was made by Dr. Wellington Koo in his speech before the League Council on December 10, 1932, when in answering Mr. Matsuoka's remarks, he said:

"The convention was made as a precaution against Japan's further encroachments upon Manchuria after her acquisition of control over Korea as the result of the Sino-Japanese war."

This direct statement stands in the record as an official admission that the treaty was entered into voluntarily on the part of China. As it was never denounced, China was bound by its terms during its full life of fifteen years and became legally responsible with Russia for the events which followed, liable for any reparations that may be claimed by Japan for losses in the war forced upon her to defend her existence. For, no matter what specious arguments are advanced to release China from her share of the responsibility, the facts of history stand unchallenged. Under the terms of this treaty Russia flooded Manchuria with her armies, converted Port Arthur into the most formidable naval fortress east of Suez and, once in full military occupation of the territory, created it into a viceroyalty, ruled from St. Petersburg. Russian armies were encamped along the banks of the Yalu, and her cruisers were scouting around the south coast of Korea seeking a naval station that would command the sea approaches to Japan. **By inviting Russia into Manchuria to save the territory from possible Japanese aggression, China opened the way for Russia to menace the very existence of Japan.**

How Statesmen were Misled

It is superfluous to dilate at this late date on the implications of an alliance that made possible the war that followed. Had John Hay even suspected the existence of this treaty, he would never have invited Japan to subscribe to the Open Door Doctrine. Japan would never have promptly accepted its provisions without reservations. Nor would Theodore Roosevelt have lent his influence to bring about a termination of the Russo-Japanese War, based on the return of Manchuria to China, had he any inkling of the existence of this treaty. It stands to reason that had Japan known of its existence at Portsmouth, she would have demanded from China a full indemnity either in cash or territory. No one who knew John Hay or Theodore Roosevelt would dare to suggest that they would have intervend to uphold China in such tortuous diplomacy. Dr. Koo states in his memorandum of December 27, that **"it is an open question who was fundamentally responsible for the return of Manchuria to China."** This attempt to drag the United States into the dispute by citing the friendly intervention of President Roosevelt is so typical of China's diplomacy as to require no comment.

The facts of history cannot be set aside. The war was fought. Peace was restored. Manchuria was handed back to China by the victorious Japanese. **They even apologized at Peking for fighting the war on Chinese territory!** The ink had hardly dried on the Treaty of Portsmouth before Russia prepared to resume the conflict. The Amur Railway was hurriedly built; work on double-tracking the Trans-Siberian Line was started; war industries were established in Siberia and a program drawn up for the rapid colonization of the Trans-Baikal region. Forced to keep pace with these war-like preparations, Japan had no option but to annex Korea in order to stengthen her strategic position.

Responsibility for the loss of Korea's independence must therefore be shouldered by China, whose secret diplomacy of 1896 let Russia into Manchuria and whose weakness and inability to defend her neutrality after 1905, compelled Japan to extend her outer line of defense to the Yalu River two years prior to the date set by Count Witte for the resumption of hostilities. During these years of frantic preparations to defend herself against the "comeback" of the then strongest military power in the world, bankrupt Japan was forced to increase her land forces to the limit of her resources. The world knew nothing and cared less of what was transpiring behind the scenes. It could only see that Japan was building up an enormous fighting machine and anathematized her as a second Germany.

These facts of history are conveniently forgotten in the present dispute over the status of Manchuria. Japan emerged bankrupt from the war with Russia only to find herself faced with another war with the same enemy. What could Japan do? She did exactly what any other nation would do under similar circumstances. She sought by every diplomatic and peaceful means to ward off the coming struggle by negotiating agreements with Russia in respect to their interests in Manchuria. Dr. Koo, the Chinese Delegate, in his remarks before the League about the Sino-Russian secret treaty of alliance of 1896, cynically declares:

> "The Japanese representative strongly criticized China's conduct in concluding this secret Convention with Russia, but I cannot sincerely believe that he has really found this conduct on the part of China to be as objectionable as his words would have us all believe, for, as representative of his country, I am sure that he knows better than any one of us that Japan, in the course of the last thirty years, had made and concluded more secret treaties and alliances than we yet know. With Russia alone she made a secret treaty in 1907, almost on the morrow of the Russo-Japanese war, and followed it up with secret treaties in 1910, 1912 and 1916, all for the purpose of dividing Chinese territory with Russia and all against the interests of China. His words of criticism on this point might have been more convincing if his own country had been less adept, in the conclusion of secret treaties and alliances."

The Geneva Debating Society

In the above remarks, Dr. Koo was taking advantage of the fact that the League is a debating society and not a court for establishing the facts. He knew better than anyone else that these secret treaties between Japan and Russia were no different from many other international agreements delimiting spheres of interest in China Proper and Tibet whose propriety has never been openly challenged by China. They were agreements entered into for the express purpose of averting a clash of economic and strategic interests that might well have led to open hostilities. All these "sphere of influence" agreements as well as the Anglo-Japanese Alliance, were forced upon the Powers as the result of China's secret alliance with Russia. In every instance they recognized and guaranteed the territorial integrity and sovereignty of China. Yet, at no time between 1905 and 1921, did Japan realize that while she was negotiating with Russia to avert another clash over Manchuria, China's secret diplomacy of 1896 was responsible for the war that forced these measures upon her. A secret treaty entered into to avert war and conserve China's territorial integrity by delimiting spheres of interest, is not in the same category as a secret military alliance under the terms of which China handed over her territory to another power to enable it to provoke and fight a war successfully.

Whatever China may now say about these Russo-Japanese secret agreements, the fact remains that as far as Japan is concerned, they operated to China's advantage. Outer Mongolia, the sphere of Russian interest, is now an independent State, incorporated without a protest on the part of China, into the Union of Soviet Republics, while Manchuria, up to the time of its declaration of independence, remained nominally a part of China. No argument advanced by China can alter the fact that all these secret Russo-Japanese treaties were signed by Japan in complete ignorance of the existence of the secret Sino-Russo Alliance which compelled her to stake her existence on the plains of Manchuria in 1905.

Once the existence of the secret treaty of alliance of 1896 becomes established as a legal fact on the release and publication of its **full** text by the American State Department, China cannot escape her share of the responsibility for the Russo-Japanese War. There is no statute of limitations to the acts of a nation, any more than there is to any major criminal case that can be reopened at any time on the discovery of new evidence. If a criminal serving a life sentence can have his case reopened after twenty or more years, surely a nation can demand the reopening of an issue that plunged it into what at the time was the most disastrous war of modern history. Japan's case against China can be reopened at any time the Japanese Government feels inclined to press its claims.

Japan's Position

Other Powers can insist upon the validity of their treaties with China signed during the last century and hold her responsible for the faithful observance of their provisions, but it seems to be tacitly agreed that Japan is not entitled to the same privilege. The world has witnessed the tragic spectacle of the gathering of the Victors at Paris to fix responsibility for the Great War as a necessary preliminary to the imposition of a suitable indemnity from the defeated foe. Yet these rules of the game as played by the Great Western Powers do not apply when an Asiatic nation emerges victorious from a hard fought war. Three times Japan has been bluffed, buncoed and talked out of the legitimate fruits of her victories by these same Powers who now insist upon their full pound of flesh when a defeated foe is at their mercy. Rather than surrender one foot of conquered territory or release their vanquished debtor, these same Great Western Powers have plunged the world in the most disastrous economic debacle of history and are now sitting solemnly in conference to find a solution without surrendering their war gains.

Yet Japan, who fought the Chinese Giant in 1895, the Russian Colossus in 1905 and who ousted Germany from Tsingtao and faithfully carried out the obligations of her alliance with Britain from 1914 to 1919, has been stripped of the fruits of her victories and is now being condemned and outlawed because she at last found the courage to insist upon her rights. Even President Wilson sent an American army into Siberia in order to prevent Japan from acquiring the little slice of Russian territory that the Allied Supreme War Council was willing to concede to her in return for her services in keeping open the communications across Siberia. We then compelled her to return Shantung to China, in order that she would have nothing to trade with in establishing her position in Manchuria.

The whole world is again bound together in an unholy alliance to deprive Japan from any benefit arising from her latest blow in self-defense. Yet Japan still has a trump card concealed up her sleeve and if and when she plays it, another roar of indignation will go up from the West that she is not playing the game. Because China successfully concealed for fifteen years the evidence of her own participation in the war of 1905, does not release her from responsibility or for any damages or reparations that Japan may now claim. Should Japan, even at this late date, hold China responsible for the war of 1904-05 and demand the indemnity she was tricked out of at Portsmouth, China would be called upon to pay seven to eight billion gold yen as the actual cost to date of the Russo-Japanese war, in addition to such value as might be placed on the loss of one hundred thousand lives and another hundred thousand wounded, a total approximating ten billion gold yen or twenty billion silver dollars.

Claims Are Still Valid

That Japan has not pressed these claims against China does not mean that they are invalidated or that she has surrendered her right to do so. The mere fact that she has refrained from demanding this compensation is proof, if such proof be needed, that she has no desire to hold the Chinese people responsible for the acts of an official who brought this calamity upon her. It is also evident that she has no desire to annex Manchuria and assume full responsibility for its government and development. That Japan has refrained from raising this question, is the strongest proof of her sincere desire to retain the goodwill and friendship of the Chinese people. For ten years the policies of Japan were based on the hope that China herself would recognize the sacrifices made by Japan in 1905 and bury the past in some new understanding that would cement the bonds of amity between the two nations. But even Baron Shidehara stoutly maintained that should China persist in opening the grave, Japan in self-defense would have to fall back upon her position created by the secret Sino-Russian treaty of alliance of 1896, **which clearly signifies aggression and hostility directed against Japan.** That the Japanese diplomats did not raise or press this point at Geneva or emphasize it in any of their official statements, is due to the fact that the issue was being definitely settled by the Army. The Japanese have always taken the position that this matter was one that concerned solely the two interested parties in which no other nation had the right to intervene.

At any time during the last twelve years, China could have bound Japan to her in ties of everlasting friendship by simply acknowledging Japan's sacrifices in 1905 in restoring her sovereignty over Manchuria and then negotiating some new agreement superseding the 1915 Treaty, based on her partial confession at Washington. This, however, China would not do. She emphasized on every opportune occasion, that the 1915 Treaty was invalid and that no new treaty of commerce and amity could be entered into with Japan unless the Liaotung Lease was surrendered and the Japanese troops withdrawn from Manchuria. China would not admit that if the 1915 Treaty was invalid, Japan's rights in Manchuria were defined by the Portsmouth Treaty, which, in view of her confession, called for reopening the case at that point. Chinese diplomats knew in their hearts that if the case was ever carried back to Portsmouth, they would be held liable for the full costs of the Russo-Japanese War. They therefore have stood pat on the invalidity of the 1915 Treaty and hoped that the United States and the League would support them, thus stripping Japan of the sole remaining fruits of her victories in three wars.

A Policy of Silence

China still holds Japan as the aggressor in 1905. **China is still the innocent and injured victim.** No Chinese diplomat or publicist will comment on the secret treaty of 1896 except to waive it aside as of no importance. This attitude reveals that they are fearful of entering into any controversy that might result in holding them responsible for what followed. Hiding behind the fact that the full text is safely reposing in the secret archives of the American State Department and, that it has never been released as part of the official records of the Washington Conference, and in the hope that their partial confession closed the case against them, Chinese diplomats at Geneva were preparing to demand a huge indemnity from Japan for the loss of lives and property in Chapei and Manchuria.

Dr. W. W. Yen clearly indicated the trend of China's diplomacy when he asked the League to declare Japan the aggressor, to dissolve Manchoukuo, compel Japan to withdraw her troops and **"make reparation for the damage she has done."** Had the League recorded a decision holding Japan responsible, China would have then carried her case to the World Court and filed a claim for an indemnity roughly estimated at five billion dollars silver.

If China is entitled to an indemnity from Japan, then Japan is equally entitled to reparations from China. This, therefore, is a clear cut issue that provides the opportunity not only for arriving at an amicable solution, but to prepare Chinese public opinion for the early opening of direct negotiations. The Chinese people have never been informed of the significance of the secret Li-Lobanoff Treaty of Alliance or its bearing on the subsequent Anglo-Japanese Alliance, the Battle of the Concessions, Spheres of Influence policies and the Russo-Japanese War. They have been educated to believe that at all times they have been the victims of foreign imperialistic aggression. Yet every move of the Powers on the Chinese chessboard during the years when it looked as though the country was to be partitioned, is traceable to a frantic effort on the part of Great Britain and Japan to defend themselves against a menace that China herself let loose upon Eastern Asia.

The conspiracy of silence which has prevented a full and frank discussion of these vital facts of Far Eastern history is responsible in large part for the events of the last two years. Refusal to recognize them almost precipitated a world war and incidents may still arise out of the present situation in North China to revive in all its fury world hostility against Japan. The dispute between China and Japan can be settled promptly and honorably if the American Government will establish the legal fact of the existence of the 1896 secret treaty by releasing its full text in its original language, which reveals China as the Ally of Russia and makes her legally responsible for her proportionate costs of the Russo-Japanese War, and for any indemnity Japan might now claim.

A Possible Solution

It should be remembered that Japan is still paying for that war not only in the form of interest on the loans incurred for waging it, but for pensions to its survivors. Japan has stood the whole cost uncomplainingly. The Japanese have never advanced the argument that they were fighting Great Britain's war; that they were protecting India against Russia and that Britain should stand her share of the expenses. The Japanese people have not cried, **"we have paid enough; we will pay no more."** They have cheerfully carried their load, contented in the knowledge that through their sacrifices their cherished independence was preserved.

The present dispute over Manchoukuo can be settled honorably and save the national dignity of China by a frank acknowledgment of these facts. The Chinese feel that they are entitled to an indemnity from Japan. Japan is equally justified in demanding an indemnity from China. If the present dispute could be brought within the realities and settled by balancing these claims, Japan's claim of some ten to fifteen billion dollars silver in excess of China's, could never be paid in cash. It would have to take the form of a cession of territory or its military occupation until the debt is liquidated. Under the circumstances, this would mean the incorporation of Manchuria into the Japanese Empire or a permanent impairment of its administrative independence. If Japan is sincere in her protestations of friendship for China and Manchoukuo; if she has no desire nor intention to annex this territory, she could magnanimously waive her claims for an indemnity on the condition that China recognizes the independence of Manchoukuo. If China, on her part, is truly solicitous for the welfare and happiness of the people of Manchoukuo and hopes to retain this friendship she can also honorably accept such a solution and let time do the rest.

G.B.R.

Geneva—Tokyo—China—Manchoukuo*

By K. K. KAWAKAMI

On February 24, 1933, the League of Nations Assembly adopted the report of the Committee of Nineteen, which caused the immediate withdrawal of the Japanese delegation. For this pretty pass both Japan and the League are equally to blame.

On Japan's side the chief fault lies in the fact that she did not present her case clearly enough before the League in the early stage of the Manchurian conflict, when Geneva, unsympathetic as it was, was still in a mood to listen to her. Japan's failure or negligence in this respect was so obvious that on January 30, 1932 (four months after the Mukden incident of September 18, 1931) the *New York Times* editorially observed that "Japan has lacked what is called good publicity," though "she had, in many respects, a good case," and that "for a time, the Chinese there (at Geneva) had all the better of the controversy, and indeed let the League of Nations too hastily take a position favorable to the Chinese contention."

When the Japanese Government did at last realize this mistake and sent Mr. Yosuke Matsuoka, unquestionably one of Japan's ablest spokesmen, to Geneva in November, 1932, it was too late, for Geneva had by then been swayed by the preconceived opinion formed in the months when Japan was singularly reticent. In fact, Mr. Matsuoka arrived in Geneva when Geneva was no longer in a mood to listen to Japan.

In such a hostile atmosphere, what was needed more than anything else was tact, patience, and soft-speaking—*suaviter in modo, fortiter in re*. Few men have ever been asked to undertake so difficult and delicate a task in Geneva as has been thrust upon Mr. Matsuoka. If the result has been disappointing to him, it certainly is not his fault, but the fault of the Government, which was too slow in awakening to the necessity of arguing its case clearly and convincingly before the League.

It must also be observed that neither the Japanese Government nor the Japanese delegation made the best use of the Lytton Commission's report. To be sure, that report contains statements which, from our point of view, are not entirely pleasing; but, taken as a whole, it is a commendable document, with observations and suggestions which Japan could have used to her advantage. Does not the report plainly say that until China has established a reliable central government, nothing worth while can be accomplished in the way of readjusting her relations with Japan or her position in Manchuria? Instead of taking the report by and large in a friendly spirit, Japan seemed to be bent upon ferretting out misstatements and erroneous judgments, some of which are of minor importance. She has missed the wood for the trees.

Before A "Packed" Jury

On the other hand, neither the League Council, nor the Assembly, nor the Committee of Nineteen, between November, 1932, and February, 1933, was disposed to give Japan a fair hearing. It was a "packed" jury which faced Japan. This I shall explain in the following few paragraphs.

The Committee of Nineteen, in preparing its report to the Assembly, claims to have taken the Lytton Commission's report on the Sino-Japanese situation as the basis of deliberation and to have been guided by it. Indeed, the Committee adopted *in toto* the recommendations of the Lytton report by saying that "the settlement of the (Sino-Japanese) dispute must conform to the principles and conditions laid down by the (Lytton) Commission of Inquiry." As a matter of fact, however, the Committee of Nineteen wandered very far afield from those "principles and conditions," and was guided, not by the facts presented by the Lytton report but by their own prejudices and preconceived notions. This is obvious in the conclusions of the Committee, which ignore the Lytton Commission's recommendations. And the Assembly, governed by mob psychology rather than by calm and independent thinking, has swallowed those conclusions, without, perhaps, understanding what they really meant. This is an all-important fact which no true friend of the League, no true lover of peace, should overlook.

What the Commission Urged

First, then, let us carefully note the more essential of the "principles and conditions" (which we shall call recommendations) laid down by the Lytton Commission for the guidance of the settlement of the Sino-Japanese controversy. These are:

(1) "Recognition of Japan's interests in Manchuria."

(2) "A restatement of the respective rights, interests, and responsibilities of China and Japan in Manchuria in new treaties."

(3) "A large measure of autonomy (of Manchuria) designed to meet its local conditions and special characteristics."

(4) Organization of "an effective local gendarmerie force" for the maintenance of internal order in Manchuria, and "withdrawal of all armed forces," Chinese or Japanese, after such a gendarmerie force shall have been organized.

At first glance, the above four conditions may appear sensible and reasonable. Close examination, however, reveals their essential defects. For one thing, how is the suggested gendarmerie force to be organized and maintained? Past experiences clearly show that such a force, even when officered by foreigners, will prove utterly inadequate to maintain order in so disturbed and so vast a country as Manchuria. At any rate, it will take many years to whip native material into an efficient police force.

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*This is a chapter from Mr. Kawakami's book *Manchoukuo, Child of Conflict*, just published by the Macmillan Company of New York. It is reprinted here with the permission of the author and the publisher.

The Crux of the Report

But we shall overlook such defects and pass on to the next recommendation, which is couched in these words:

> (5) **"Since the conditions enumerated above cannot be fulfilled without a strong central government in China, the final requisite for a satisfactory solution is temporary international co-operation in the internal reconstruction in China."**

To all practical purposes, the above thirty-two words constitute the essence and the only important part of the Lytton report. Until the condition expressed in these thirty-two words is fulfilled, the rest of the hundreds of thousands of words contained in that document are of no practical value. As is evident in the wording of the above-quoted final recommendation, the Lytton Commission itself thinks it of little use to discuss the recognition of Japanese rights, the conclusion of Sino-Japanese treaties, the organization of gendarmerie, the establishment of an autonomous Manchuria, the withdrawal of troops, etc., until and unless China shall have succeeded in establishing a united, stable, effectual central government which is capable of observing laws and treaties and with which foreign governments may deal with confidence. To find out this simple truth, it should not have taken such a painstaking, arduous, and thoroughgoing investigation as was undertaken, at such a great cost, by so distinguished a body of diplomats, soldiers, statesmen and scholars as the Lytton Commission. Japan, for one, has known it for more than twenty years, and it is at least consoling to her that this simple truth has at last been presented as a revelation to Geneva, that hub of the universe, through the Lytton report.

But the Committee of Nineteen, which was supposed to have acted upon that revelation, completely ignored it, and jumped blindfolded into the topsy-turvy conclusion that the withdrawal of Japanese troops from Manchuria is the prerequisite of everything else. It even ignores the Lytton Commission's suggestion for the establishment of an efficient gendarmerie force as a preliminary to the withdrawal of Japanese troops. It is eloquently silent on the chaos and anarchy which is certain to follow troop withdrawal. Evidently the nineteen wise gentlemen thought that evacuation of troops would work miracles, producing automatically in its wake a powerful gendarmerie which would chase hordes of bandits on to the hills and make them stay there, and an efficient autonomous government capable of administering the vast territory of Manchuria. In short, troop withdrawal would at once usher peace, order, and happiness into distracted Manchuria. Once the Japanese soldiers turn their backs to bandits and Chang Hsueh-liang's "volunteers," everything good and desirable would just grow like Topsy. Beautiful vision this, but is it practical? Lord Lytton and his four associates and their learned expert-advisers did not think so.

Let us, then, go back to the Lytton recommendations. Suppose that the League really acted upon those recommendations and proceeded to overhaul and regenerate China herself, as the first step toward the readjustment of the Manchurian situation what would happen? China, of course, would never permit Geneva to undertake this humanitarian task in her behalf, which would of course, reduce the whole scheme evolved by the Lytton Commission to a castle in the air, alluring but unreal.

But let us suppose that China would be acquiescent. If this grand scheme of overhauling China should prove a success, and if the China thus regenerated should prove a better-governed and happier country than Japanese-tutored Manchoukuo, there is little doubt that Manchoukuo would of its own volition go out of existence as an independent state and would rejoin China. But the overhauling of so vast a country as China could not be accomplished in a jiffy—it would require many years and even decades. In the meantime, Manchuria, or Manchoukuo, should not be left adrift or to shift for itself—a prey of organized banditry, militarist exploitation, and what not. It might be just as well to leave it under Japanese tutelage, as it is at present, and let it progress on the road to modernization, while China, under the international tutelage envisaged by the Lytton recommendations, might also similarly progress. It would be interesting to watch which would make the greater progress. The competition thus kept alive might prove an incentive and encouragement for greater endeavor on the part of either nation. Should China win this race for self-improvement, Manchoukuo would, I am sure, desert its Japanese tutor and return to China's arms. If, on the contrary, China should continue to wallow in the mire of chaos, while Manchoukuo made steady progress, then four hundred million Chinese of China might wish to become the subjects of Mr. Henry Pu-yi. Who knows?

II

The Lytton Commission's report on the Sino-Japanese dispute brings out the following points:

First: That the Sino-Japanese treaties which existed in September, 1931, are binding on both signatories, and that the Japanese rights defined by those instruments must be respected.

Second: That anti-foreign, and in this particular case anti-Japanese, boycott employed by China as an instrument of national policy "involves a measure of (Chinese) Government responsibility."

Third: Nowhere in the report does the Commission suggest that the Japanese troops be withdrawn as a prerequisite of negotiations between China and Japan on the basis of the above two general principles. On the contrary, it suggests organization of an effective gendarmerie force as preliminary to troop withdrawal.

These points cannot be too strongly emphasized. Had the League Council taken the above stand in September or October or even November, 1931, there is not the slightest doubt that Japan would have been more than willing to negotiate with China (whatever "China" might have meant) and liquidate the Manchurian situation with dispatch, because all that Japan wanted was a guaranty of her treaty rights in China, including her right to trade, free from officially encouraged boycotts. This Japan repeatedly made plain before the League and the world. Had this course been followed, the dispute would have been settled at once, and China and Japan would have been at peace, at least for some years.

The Mistakes at Geneva

But the League Council, instead of taking the above stand, concentrated its futile efforts upon compelling Japan to withdraw troops before Sino-Japanese negotiations could be opened for the guaranty of Japanese treaty rights. This produced two unfortunate effects. On one hand, it made China think that she had the League in her pocket. On the other, it stiffened the Japanese army, who knew, as did all Japanese, that the troops could not be withdrawn.

If the Lytton Commission, after a painstaking and exhaustive study of the actual situation, explicitly recognized (as it actually has) the legality of Japan's treaty rights in China, and implicitly recognized the necessity of maintaining Japanese troops in Manchuria, then the League Council (which, when Japan was anxious to negotiate with China on these very terms, refused to let her so negotiate, but merely insisted upon troop withdrawal) must, in the light of the Lytton report, confess that it was short-sighted and committed an irretrievable error. The Council's dilly-dallying in the early stages of the Manchurian trouble brought about a situation which it could not foresee and which cannot now be altered—namely, the appearance of an independent Manchuria.

The logical conclusion is that the Council has its own lack of vision to thank for the independence of Manchuria. This it should have confessed before the world in sackcloth and ashes. Instead it whitewashed or rather completely ignored its own error, and made Japan the scapegoat.

In fairness, however, it must be admitted that this was not the fault of the Council alone; perhaps the fault lies in the nature of the League itself. This Manchurian controversy shows that no grave international problem can ever be settled at an international forum where all nations, most of which have not the slightest interest in and know nothing about the problem in question, are permitted to air their prejudices and views, each, as often as not, with an eye upon some third party or parties, or with an axe to grind.

III

I have said that direct negotiations between China and Japan, if opened in the last months of 1931 on the basis of the then existing treaties (since recognized by the Lytton Commission), would have effected a peace which would have been maintained at least for some years. I say "for some years" advisedly, because it is doubtful that lasting peace could be secured through any agreement signed in any way between China and Japan. This difficulty is fundamental and inherent; it comes from the fact that China is a house divided against itself, not only between North and South, but also between East and West, North-east and North-west, South-east and South-west. China is a chaotic void. Dr. Wellington Koo, Mr. W. W. Yen or Mr. Alfred Sze do not represent China; they represent only a fragment of it and they know it. Even the *New York Times* on March 2, 1933, editorially admitted that "China does not answer to the definition of a nation as contemplated in the Covenant of the League of Nations." Any treaty signed with such a governmental void is a make-believe which can do no more than patch up peace of a sort only for the time being. This fundamental difficulty has always been, and still is, an insuperable barrier against any satisfactory arrangement calculated to ensure peace between China and such of her neighbors as have vital interests in her territory. In the light of this difficulty, it is perfectly understandable that Japan embraced the first opportunity to deal with an independent Manchuria which placed itself under her tutelage and which, she thinks, furnishes, in the long run, a better guaranty of peace than is afforded by a chaotic China.

The Position of Chiang Kai-shek

At this time of writing (March 10, 1933), it is reported from the Far East that Marshal Chang Hsueh-liang, the ousted war lord of Manchuria, has definitely resigned his post as commander of the northern army and has agreed to place his soldiers, 150,000 strong, under the authority of Chiang Kai-shek, the Nanking generalissimo. As far as the so-called Central Government at Nanking is concerned, this sudden development is entirely fortuitous; it is due, not to any increase in Nanking's ability to unify China but to the crushing defeat which has been inflicted upon Chang Hsueh-liang by the Japanese-Manchoukuo campaign in Jehol province. This is exactly what Chiang Kai-shek has for years been praying would happen. He himself has been powerless to eliminate Chang Hsueh-liang and his army, and has hoped that the Japanese would do the job for him. There is not the slightest doubt that the Nanking generalissimo is sincerely grateful to Japan and Manchoukuo for their Jehol campaign, which has led to Marshal Chang's resignation and possibly his definite elimination as a military factor in North China. That explains why Nanking had never sent a single soldier to the north to help Chang Hsueh-liang in Jehol. A shrewd politician, Chiang Kai-shek, for reasons of domestic politics, will, in all probability, continue to proclaim to the world, as he has so often done, that he is a sworn enemy of Japan. But at heart he is thankful that Japan has fought his battle against the former Manchurian war lord, and has thus made it possible for him to send to Peiping his faithful aide, General Ho Ying-chin, as new commander of the northern forces. I should not at all be surprised if Chiang Kai-shek, after making a feint of fighting the Manchoukuo-Japanese forces along the Great Wall for a while, should call a halt to his generals and then issue some such statement:

"I am as bitter an enemy of Japan as I have ever been, and I dedicate myself to the task of restoring Manchuria to China. But at this moment, and for some time to come, we must bend all our energies to the suppression of the Communist armies in Central China and to the unification of China proper. When this is accomplished, I shall go to the north and fight the Japanese to a finish."

Whether or not Marshal Chiang will take this course depends upon the attitude and strength of the semi-independent regional anti-Nanking governments, such as those of Canton, Shantung, and Shansi, as well as the Communist Government in Kiangsi. If these factional governments should prove too vociferous in denouncing Chiang Kai-shek's "lukewarm" policy towards Manchoukuo the Nanking generalissimo may, in spite of himself, be forced to keep on fighting Japan and Manchoukuo. Thus we are forced to come back to the conclusion of the Lytton Commission to the effect that the establishment of a strong central government in China is the prerequisite of a satisfactory solution of her international problems.

Now let us go back to Geneva and see what would have happened had Japan accepted the recommendation of the Committee of Nineteen in January or February of this year when Chang Hsueh-liang's power was still intact and his troops were overrunning Jehol province. The Manchoukuo-Japanese campaign of pacification against Jehol would have been nipped in the bud, and all Japanese troops withdrawn from all points outside the South Manchuria Railway zone, thus casting the vast territory of Manchuria, except the said zone, a narrow ribbon of land, to the mercy of Marshal Chang. With the Japanese soldiers under the League's rigid order not to advance a step out of the railway zone, Marshal Chang would have been free to re-enter Manchuria, set up his government at Chinchow or Shinminfu, and let loose forces of mischief all over the country.

An Impossible Course

In such circumstances, how could the League have expected to put the recommendation of the Committee of Nineteen into execution? To what Chinese authority could it have restored Manchuria had Manchoukuo, under the said recommendation, gone out of existence? Nanking, *faute de mieux?* Suppose, then, that the League and Japan had agreed to hand Manchuria over to Nanking, what would Chang Hsueh-liang (then still entrenched in North China with 150,000 soldiers) have done? He would have balked and blocked any such agreement. At that time he still cherished the idea that he, not the Nanking faction, should be the one to get back Manchuria, if Manchuria was to be restored to any Chinese authority; and he was then powerful enough to make good this intention, for, under the League recommendation, the Japanese troops could not stop Chang's re-entrance into Manchuria.

The Lytton Commission's report plainly says that "a mere restoration of the *status quo ante* would be no solution" of the Sino-Japanese dispute, and that such "would be to treat the whole question theoretically and to leave out of account the realities of the situation." The Commission, however, sympathetic to China, was forced to recognize the state of flux prevailing in China and the precariousness, or rather absence, of her central authority, always militating against the satisfactory adjustment of her foreign relations. This view, so unmistakably expressed by the Lytton Commission, has been ignored by the Committee of Nineteen and the Assembly.

If Chiang Kai-shek were powerful enough to defy all the factions aligned against him, he would probably come to terms with Japan on the Manchurian question, but he is not. At this moment no one can tell what will be the effects of his temporary advance to North China through the entirely fortuitous event of Chang Hsueh-liang's defeat at the hands of the Manchoukuo-Japanese forces. If the past is a clue to the future, any agreement signed between Nanking and Japan, no matter how reasonable, is certain to be assailed and even made a cause of fresh civil war by Canton and other anti-Nanking regional governments, as well as the "Communist" forces, all firmly entrenched in their respective spheres of control. Those factions, like the traditional Irishman, are always and unalterably "agin" any institution which claims to be the central Government of China. They will exploit any agreement, designed to settle the Manchurian dispute between Nanking and Tokyo, as humiliating to China, regardless of the merits of the agreement. They will incite boycotts and violent agitation against the Japanese, just as the Cantonese did before the outbreak of the Shanghai incident of January 28, 1932, all for purposes of domestic politics—namely, to embarrass the Nanking régime. It makes no difference whether the agreement is just or not; it is enough that they pretend to believe that it is unjust. This is not a hypothesis or an assumption; it has happened again and again. Indeed, China's history since 1911 has been largely a repetition of the same process. Denmark, Switzerland, or Spain, may be indifferent to all this, but Japan, for obvious reasons, cannot be. Any academic and idealistic plan for Manchuria which does not take into account the realities of the situation is more mischievous than useless. Thus we are impelled to come back to the Lytton Commission's fundamental suggestion that the establishment of an effective central government must precede all other readjustments.

The League is asking Japan to do what no other Power, if similarly situated, would do. It proposes to make Japan the first object of its uncertain, grandiose experiment. Japan might have accommodated the League had her interests at stake been not so great as to affect her very existence. Things being as they are Japan cannot afford to take the risk inherent in such an experiment.

It is not fair to compare Japan's vital rights in Manchuria with the comparatively small British oil concession in Persia. Japan would have gladly submitted to the arbitrament of the League any dispute developing from any oil concession in a country thousands of miles away. Comparison is odious, and, moreover, no case exactly analogous to the Japanese case in Manchuria can be found.

III

If the League thinks that its refusal to recognize Manchoukuo would force Japan to recede from her present stand, it is likely to be disappointed. It may be shocking to the protagonists of the non-recognition doctrine to learn that Japan, and for that matter Manchoukuo, too, are not seriously concerned with the decision made by the League in this respect, but it is a fact nevertheless. True, Manchoukuo has been clamoring for recognition as a matter of principle. As a practical matter, however, I doubt that recognition is desired by Manchoukuo in the immediate or even near future. I have a sneaky feeling of suspicion that neither Japan nor Manchoukuo really wants recognition, at least for some years to come. If Manchoukuo were recognized now, the Powers, by no means friendly disposed towards it, will station at Hsinking their representatives, whose critical eyes will no doubt detect, even ferret out, flaws and faults in which the new State will not be lacking in its formative stage. For a while, it would rather be free from such critical eyes, so that it could carry out its program in its own way.

Morally, non-recognition, I fear, makes little impression upon Japan, because she is convinced of the justice of her cause. Non-recognition may hurt a guilty conscience, but it is devoid of force when applied to a nation which believes itself in the right.

The Japanese Viewpoint

Japan believes that she has delivered the 30,000,000 inhabitants of Manchuria from the yoke of the worst tyranny known to the modern world, and that she is assisting in the establishment of a new government which promises to keep out Chinese anarchy and to give a benevolent and beneficial rule to the people who have long endured official extortion and militarist plunder with mute resignation.

Japan is confident that organized banditry, which has cursed Manchuria for centuries, will cease within a few years, and that peace and order will soon prevail throughout the region. Beginnings in that direction are perceptible. Manchoukuo, with Japanese aid, has already unified and stabilized its currency, has abolished a few taxes, and has reduced the rate of some of the taxes which are still levied. It has even taken a step toward the solution of the opium evil, the age-long curse of China.

The above statements find unqualified support in the following passages from Mr. Hallett Abend's article in the *New York Times* dated Mukden, December 21, 1932:

"After even a short trip through Manchuria has served to reveal strikingly the real progress which Japan has made toward stabilizing the country, any sojourner in Mukden must agree, at least to some extent, with the arguments of Japan's delegates at Geneva to the effect that China will almost certainly continue in a condition of turmoil and disunity for the next ten or twenty years.

"Anyone who has visited Manchuria for from four to six different times every year during the last seven years, as has this correspondent, cannot fail to admit that Manchuria to-day, as it was six years ago and four years ago and two years ago, still is the most progressive and best administered portion of what maps and atlases label 'China.'

"Conditions in Manchuria to-day, with all the drawbacks and serious problems, are better than conditions prevailing in the Yangtze Valley or in North or South China."

Yosuke Matsuoka, Japan's chief delegate to Geneva, expressed the general Japanese conviction when he said in a press interview:

"We do not take. We are in a position to give. Japan has taken all she needs from the West, assimilated and naturalized Western mechanism and materialism. That much richer by a code and modernization which supplement our own traditional civilization, we hold a unique position among Far Eastern countries. Our occupation of Manchuria is not a question of 'taking' Manchuria in a military sense or of taking anything away from Manchuria in a moral sense. It is Japan who is giving Manchuria precious principles of self-development, progress and spirituality. This melting-pot of Asia, where meet and mingle Japanese, Chinese, Manchus, Mongols, Koreans, Siberians, and Russians, Red and White, one day may be able to save the whole of China."

Mr. Matsuoka further said that if, in time to come, a renascent and vitalized Manchuria of Japan's molding and inspiration should desire to throw in her lot again with China, there would be none to hinder. "That would be but one of Japan's many contributions to humanity."

International Misunderstandings

Japan, to take such an attitude, may be a modern Don Quixote. Perhaps she is fanatical. Perhaps she is mad. But whatever she is, she faces the world with a clear conscience; and the world, unable to fathom her mind, looks at her with mingled wonderment, perplexity, fear, and suspicion. It is a case of utter lack of understanding, comparable to the usual misunderstanding between a Victorian parent and a modern youth. That is the tragedy of it.

Meanwhile, the Powers cannot, and will not, ignore Manchoukuo, even though they are too prudish to recognize her. Her territory is too vast and potentially too rich to be ignored. As a matter of fact, some of the Powers are casting furtive glances toward her. They are accepting, even demanding, handsome sums from her. Who take the eleven million *yuan* or so which Manchoukuo is called upon to remit every year to the Inspector-General of Customs of China out of her customs receipts? The Powers, America included. Again, who take the two and one-half million *yuan* which Manchoukuo sends to the Inspector-General of the Salt Gabelle annually? Again the Powers, who have claims against China. And yet the Powers pretend that they have nothing to do with Manchoukuo. That is neither good sense nor good taste.

Furthermore, the Powers have been pressing upon the Manchoukuo Government the demand that it settle the claims of their respective nationals who had sold to the old Chang régime goods which had not been paid for when the new Government replaced it. Certainly the Powers have not ignored Manchoukuo. Their nationals will continue to live and trade in Manchoukuo. Their consuls are there to look after the interests of their respective countries. How can they perform their duties if they have nothing to do with Manchoukuo?

I agree with President Lowell, of Harvard University, when he says that the principle of the non-recognition cannot be maintained for any length of time. "There are," he says, "profits to be made by outsiders in Manchoukuo, and, when the strength of feeling has subsided, will not some nation seek to obtain them —not at first by direct recognition, but in substance? Will not others follow suit, until practically the whole system has broken down?"

IV

I have long felt that Japan will somehow, some time, retire from the League. If possible, she would leave it in the same friendly spirit in which she agreed to dissolve her alliance with Great Britain in 1922. For that reason she would, if she could have her way, withdraw under happier circumstances than are at present possible. But if she does not quit the League now, she will quit it eventually.

The League, in its conception and inception, is primarily and essentially a European institution. It was meant to solve, if possible, Europe's own problems which had so often converted the Continent into a battle-field. Japan stumbled into it by accident, or to be more accurate, by reason of the minor rôle she had played in the World War. Japan has contributed little, if at all, towards the solution of any of the multitudinous problems of Europe, as indeed she could not, but has imposed upon the League obnoxious problems of which the League would gladly have steered clear. Japan's withdrawal, then, may be considered a good riddance for Geneva.

Why Japan Joined the League

Japan, on her part, realizes that she does not really belong to the League. Once out, Japan is more than unlikely to return to the League's fold, but will in all probability follow the American example, co-operating with the League in disarmament and in such humanitarian enterprises as may appeal to her. She feels that she could contribute nothing towards the unravelling of the tangled skein of Europe, and that Europe could do even less towards the solution of the problems of the Far East.

For a time, the League dazzled Japan. She was proud of the high place accorded to her in the League. The prestige thus given her was pleasing to her. Her diplomats presided over various commissions entrusted with the solution of European disputes, which satisfied their and her vanity. But nations have more vital matters to consider than national vanity or even prestige. Japan now realizes that for a Japanese diplomat to preside over a commission to solve any political problem of Europe which he does not really understand is as unnatural as for a European diplomat to preside over a commission to solve a Far Eastern problem which he does not comprehend. Japan now sees the League and herself without glamour and with no illusion.

The Manchurian decision of the League will serve to strengthen Japanese skepticism as to the capability of any European tribunal of rendering unbiased decision on any question involving the interests of an Oriental nation. Ever since the Hague Court of Arbitration, in 1905, decided against Japan on the question of foreigners' immunity from taxation, this skepticism has prevailed in large circles in Japan. Let me briefly describe this case.

When Japan opened her doors to foreign intercourse in the middle of the last century, she agreed to set apart certain sections in the open ports for the residence and trade of Europeans and Americans. In these "settlements" the foreigners secured from the Japanese Government perpetual lease of lands, tax-free and paying rents which were less than nominal. Of course, the Japanese Government had no intention of extending this tax immunity to the buildings to be erected upon those lands. But the foreigners refused to pay tax on these buildings worth tens of millions of *yen*, and this refusal was supported by their respective home Governments. So the dispute was submitted to the Permanent Court of Arbitration at the Hague in 1904. The tribunal which considered this case consisted of two arbitrators and an umpire. The arbitrators were M. Louis Renault, professor of law in the University of Paris, representing the three European governments concerned, and Mr. Ichiro Motono, the Japanese Minister at Paris, representing the government at Tokyo. The umpire was Mr. Gregers Gram, formerly Norwegian Minister of State. The decision rendered under date of May 22, 1905, sustains the contention of the European Powers that the treaties exempt not only the land but "buildings of every description constructed or which may hereafter be constructed on such land, from all imposts, taxes, charges, contribution, or conditions whatsoever."

The significance of this decision lies not so much in its material effects as in its moral influence. The point at issue was the principle involved. The Japanese were, and are, firmly convinced of the justice of their contention on the above tax question, and were grieved that their first experience with an international tribunal proved disappointing. What unbiased critic shall deny that the Japanese contention was just and incontrovertible? The Japanese disappointment experienced at the Hague and the consequent Japanese skepticism have been made infinitely more poignant by the sneaky manner in which the League Council whitewashed the grave and grievous error it had committed at the beginning of the Manchurian trouble, and by the brusque and overbearing manner in which the Committee of Nineteen and the Assembly have brushed aside Japan's argument and even the recommendations of the Lytton Commission.

V

Finally, Japan now fully realizes that, however accommodating she may endeavor to be in dealing with China, she will always be exposed to the menace of Chinese boycotts, which, except in rare instances, are not motivated by patriotism but by a downright scheme of blackmail, as I have shown in my previous book, *Japan Speaks*. Japan has suffered from this Chinese "racket," which is employed as an instrument of national policy, at various intervals during the past twenty-seven years. Of course Japan denies emphatically the legality and justifiability of such boycotts, but insists that they are a clear violation of treaty stipulations. But whether legal or illegal, whether justifiable or unjustifiable, boycotts are a factor which Japan must take into account in formulating her future commercial policy abroad. More and more will she strive to deflect her trade from China to other parts of the world, and thus offset the effects of Chinese boycotts by trade gains elsewhere. Without in the least abandoning the contention that the boycott is a treaty violation, Japan will, at the same time, follow this course of readjustment.

And this process of readjustment has already begun to bear fruit. Japan's trade returns from January 1 to August 30, 1932, show that, while her exports to China, Hongkong, the Straits Settlements, and a few places where the Chinese population is preponderant, have decreased by Y.50,219,000 as compared with figures for the corresponding period in 1931, her exports to other countries such as India, the Kwantung Leased Territory, Java, Persia, Asia Minor, Africa, Oceania, and Europe, have increased by Y.58,892,000 a net gain of Y.8,687,000.

I have no later figures on hand, but I know that our export trade since August, 1932, has been even more favorable. Thus Japan is making up her losses in China by extending her export trade into new markets. The Powers at Geneva, by taking the suicidal attitude of encouraging Chinese boycotts, have virtually invited Japan to make incursions into their own markets. Moreover, I am convinced that the time will come when China will employ boycotts against other Powers than Japan, as she did against America in 1905 and against Great Britain in 1925-26. Some day the League's chickens will come home to roost.

The Independent Status of Manchoukuo

OUTLINING recent developments in China, the League Commission of Enquiry states in its Report: (page 17)—

"The present Central Government repeatedly had to fight for its very existence. For a time unity was maintained on the surface. But not even the semblance of unity could be preserved when powerful war-lords concluded alliances amongst themselves and marched their armies against Nanking. Though they never succeeded in their object, they remained, even after defeat, potential forces to be reckoned with. Moreover, they never took the position that war against the Central Government was an act of rebellion. It was in their eyes simply a struggle for supremacy between their faction and another one which happened to reside in the national capital and to be recognized as the Central Government by the foreign Powers."

Describing the birth and development of the Communist movement in China, the Report says: (page 23)—

"It has become an actual rival of the National Government. It possesses in its own law, army and government and its own territorial sphere of action. For this state of affairs there is no parallel in any other country......"

"The process of fermentation, inevitable in a period of transition, has developed forces of public opinion which will probably continue to embarrass the Central Government in the conduct of its foreign policy, as long as it is weakened by failure to complete the unification and reconstruction of the country. The realization of China's national aspirations in the field of foreign relations, depends on her ability to discharge the functions of a modern government in the sphere of domestic affairs, and until the discrepancy between these two has been removed, the danger of international friction and of incidents, boycotts, and armed interventions will continue."

"War against the Central Government in China is not an act of rebellion but merely a struggle for supremacy

between factions." The logical deduction is that each province (there are as many factions as provinces) considers itself an independent unit with the right to take advantage of any situation to impose its rule over the rest of the country by force of arms.

After painting the above accurate and dismal picture, the Commission recommends that Manchoukuo be recognized as an autonomous state, policed by an international gendarmerie, under a Chief Executive appointed by a Central Government that cannot be made to function without international co-operation. The Commission's final condition for a satisfactory solution of the dispute is: (page 131)—

> "Since the present political instability in China is an obstacle to friendship with Japan and an anxiety to the rest of the world (as the maintenance of peace in the Far East is a matter of international concern), and since the conditions enumerated above cannot be fulfilled without a strong Central Government in China, the final requisite for a satisfactory solution is temporary international co-operation in the internal reconstruction of China as suggested by the late Dr. Sun Yat-sen."

For a strong Central Government to be effective, the Commission says (page 19 of the Report) that "present inadequate means of communication in China is a serious handicap in maintaining law and order."

> "Unless communications are sufficient to ensure prompt transportation of national forces, the safeguarding of law and order must largely, if not completely, be entrusted to provincial authorities, who on account of the distance of the Central Government, must be allowed to use their own judgment in handling provincial affairs. Under such conditions, independence of mind and action may easily cross the boundary of law, with the result that the province gradually takes on the aspect of a private estate......The danger of civil war must continue to exist so long as the Central Government lacks the material means to make its authority swiftly and permanently felt all over the country."

In the above statements, the Commission sets forth certain basic truths about conditions in China essential to a proper understanding of her problems. It makes clear that instead of a properly organized state ruled by a representative government, each province (or faction) holds itself independent with the right to take advantage of any opportunity to impose its rule over adjacent provinces or, if strong enough, over the whole country. A Central Government exists solely to conduct international relations, deriving its special position and privileges from the recognition of foreign Powers interested in preserving their treaty rights and their trade. Its authority as a Central Government begins and ends right there.

Ballots are Bullets and Bayonets

Unable, through lack of adequate communications, to enforce respect for the powers conferred upon it by foreign recognition, the so-called Central Government cannot function where it cannot despatch its armies. Until adequate means of communications are provided, a strong Central Government cannot exist. If, and when, these means of communications are provided, its right to rule will then depend upon its ability to subjugate the other provinces by brute force.

If war against the Central Government is not an act of rebellion but a struggle for supremacy between factions, it means that bullets, bayonets and bombs are the determining votes in a "republic" which has failed to set up the machinery for registering the will of its people. This is the Donnybrook recognized by the League and the Powers as a sovereign state, representative of a free people, where war, massacre, torture, confiscation and grinding oppression are legalized and encouraged in order that one faction may establish its rule over all the others.

If a government cannot exercise its sovereignty within, whence does it derive its right to recognition from without? All the international troubles of China arise from ignoring this fundamental requisite of statehood: the attempt to hold an impotent government responsible for its authority over territories which reject its intervention in their affairs. The condition proposed by the Commission gives rise to the question: Will the construction of adequate means of communications facilitate unification or precipitate further disintegration?

The recommendation of the Commission is based on the premise that there exists in China sincere desire for unification. If this sentiment really prevails, it should not require any pressure from the Central Government or the expenditure of foreign money to enable it to make its authority swiftly and permanently felt. If the factions of China will not sink their differences and unite of their own free-will (even when threatened with a foreign war), it stands to reason they will oppose any plan of conquest by railway financed by the League.

Control of these railways will become the objective of further civil wars and unification will be as far off as ever. It is only necessary to recall that the Revolution of 1911 had its inception in a similar scheme. Even the Canton-Hankow North and South arterial line could not be completed without a clear understanding as to the rights of Nanking and Canton in its management, operation and policing. Not until the war-lords and factions of China unite peacefully, disband their armies and adopt some system of representative government, will new railways cement the provinces together into a compact national whole.

Yet the Commission recommends in effect that the League assist Nanking to raise nearly a billion gold dollars in foreign loans in order to enable it to consolidate its rule over those factions which challenge its supremacy. In the meantime while these huge sums are being expended to provide adequate means of communication, the Commission proposes that the League act as trustee in Manchoukuo for the Government it is setting up and enforcing on the rest of China!

A Bit of History

The Nanking Government established itself in supreme power by accepting the sympathy and support of one foreign Power and is now fighting for its very existence against the forces released as a result of that alliance. Before it has consolidated its authority in its own sphere, the Commission recommends that international assistance be extended to it in order to impose its rule over all other parts of the country!

The Government of Manchoukuo might appeal to the same logic to vindicate its right to conquer China. It might, with equal propriety justify its alliance with Japan with the same arguments advanced by Canton to explain its secret pact with Moscow. But the Government and people of Manchoukuo have no intention of challenging the rule of the present foreign-recognized Nanking Government in territories south of the Wall. Manchoukuo is content to retain its traditional independence in its own sphere and separate itself from a Bedlam where war against the Central Government is not considered an act of rebellion, but a test of strength for supreme power.

Manchoukuo is not a rebel government, but a full equal of Nanking. Manchoukuo's declaration of independence cannot be construed as an act of rebellion against a faction that never exercised authority in its territory. It merely seized the opportunity created by Japan's resort to self-defense to oust a local tyrant who at the moment was absent from his territory, engaged with his armies in a legitimate struggle for supremacy with the foreign-recognized faction at Nanking. As Nanking was not strong enough to subjugate him by armed force, it purchased his friendship by showering upon him titles and favors and recognizing his right to rule North China, were he usurped the power of another faction too exhausted to challenge his position by armed force.

The agreement entered into between the ex-war-lord of Manchuria and Nanking, does not bind the Government or the people of Manchoukuo to recognize the Nanking faction. It is merely a pact between two war-lords for the division of territory, signed without any regard for the will and wishes of the people of Manchoukuo or of North China. Nanking now takes the position that Manchuria is the private estate of Chang Hsueh-liang and to support him has handed over to his appointees the direction of its Ministry of Foreign Affairs and its Representation on the League of Nations. It furthermore supplied him with arms, men, munitions and money to assist him in recovering his "patrimony."

The Underlying Purpose

In the meantime, his delegates at Geneva were demanding that the League, the Nine Powers, the Signatories to the Kellogg Pact, the whole world in fact, uphold by force or sanctions this alliance to subjugate a people that have always been independent of an equal with Nanking. The policy of Chang Hsueh-liang and Nanking was clearly outlined by Chang's lieutenant, Dr. W. W. Yen, in a statement given to the press on October 16, 1931, before proceeding to his post. He said :

> " China is at the cross-roads. One means following instinctively the rule of law and reason in international affairs. The other leads to the adoption of extremist ideas and measures which have little regard for the consequences. This road will be followed in disappointment and desperation. The decision and responsibility for the decision as to what road China will follow, rests largely upon the attitude and actions of nations whose ideals and interests are seriously menaced by the militaristic violations of agreements designed to maintain peace."

This program was definitely laid down at the very outset of the dispute. An editorial article in *The Peking Leader* of September 24, 1931 (the official organ of the Chang Hsueh-liang Government) says :

> " The signatories of the Kellogg Pact are indifferent because war has not been created by Japan's unwarranted invasion of Chinese territory. Public sentiment is being worked up and sooner or later, the Chinese nation, if it is going to remain one at all, will have to rise and create a rumpus to turn this international aggression into an international war—to conform to the requirements of the Kellogg Pact."

The dispute before the League narrowed down to whether or not it is to intervene and support the foreign-recognized faction power at Nanking to impose its rule over an independent province and legalize the title of a tyrant to hold the territory as his private estate, or, accept the Report of its Commission which clearly defines the Chinese conception of provincial independence. Should the League decline to support Nanking, the world must expect that Dr. Yen's threat will be carried out.

The Russian Factor

The Government of Manchoukuo invites attention to the fact that the conversations which led to the re-establishment of diplomatic relations between Moscow and Nanking, were held in Geneva between Dr. Yen and Litvinoff. The official announcement of the renewal of these relations was made in Geneva by Litvinoff. Dr. Yen later was appointed as the Chinese Ambassador to Moscow.

The Government of Manchoukuo sees in these recent moves, merely the carrying out of a definite program decided upon months ago.

The Chinese Delegates to the League have quoted from many Japanese unofficial publications and forged documents to prove that Japan is following a set program for the ultimate conquest of all Asia as a preliminary to the subjugation of the United States and world domination. It may not be out of place to invite attention to the following lines in the Report of the League Commission of Enquiry, where, in explaining the trend of Chinese nationalism, the Commission says : (page 18)—

> . . . " The influence of the Kuomintang has introduced into the nationalism of China an additional and abnormal tinge of bitterness against all foreign influences, and has expanded its aims so as to **include the liberation of all Asiatic people still subject to ' imperialistic oppression.' "**

This policy still guides the diplomacy of the Kuomintang.

The Government of Manchoukuo invites attention to the fact that at no time has Nanking expressed a willingness to negotiate direct with Japan or with Manchoukuo. It remains inflexible in its determination to force an international solution that will commit the Powers to uphold the decision arrived at. The Government of Manchoukuo furthermore emphasizes that at no time since the incident of September 18, 1931, has Nanking attempted to directly assert its alleged authority over Manchuria. From the very inception of the trouble it delegated its powers to the ousted war-lord, Chang Hsueh-liang, supporting him diplomatically, financially and with armed forces to re-establish his hold over a people resolved to fight to the death rather than again submit to his yoke.

Even after the publication of the Report of the League Commission of Enquiry with its scathing denunciation of the tyrannical rule of Chang Hsueh-liang and its recognition that a mere restoration of the *status quo ante* would not solve the problem even if it were practicable, the Nanking Faction continued to recognize and confirm him in his position and powers. Chang's main armies were massed along the borders of Jehol. So-called volunteers and irregulars in the pay of Chang were making Jehol their base of operations and raiding the territory of Manchoukuo. On all sides were seen preparations for war on a large scale. The foreign-recognized faction at Nanking was preparing to coerce Manchoukuo into submitting to its supremacy through the instrumentality of the despot it kicked out. Nanking, speaking at Geneva through the lieutenants of Chang, asked the League to support it in this unholy adventure, threatening to precipitate an international war if their appeals were ignored.

The Government and people of Manchoukuo make no appeal. They utter no threats. Convinced of the righteousness of their cause, they intend to defend their independence and liberties against any and all attempts to reimpose upon them the rule of their old tyrant. The Government of Manchoukuo again reminds the League that war against the foreign-recognized-Central-Government is not and act of rebellion, but a struggle for supremacy between independent factions. Should Nanking force the issue, it must assume responsibility for the consequences. The outcome of such a struggle will determine the history of the Far East for the next half-century.

Statistical Report on Japan's Cotton Industry

By EISABURO KUSANO

JAPAN's cotton spinning and weaving industry now faces a crisis which is more serious in nature than all the difficulties that it has hitherto pulled through. This crisis is the possibility of the arbitrary control by the British Government of Japan's export trade with the British colonial possessions.

The British Government proposes to denounce the Indo-Japanese convention of 1905 (containing the " most favored nation " treatment) upon the expiration of its present term in October, 1933. When this proposal was made through official channels in April, this year, it came as a bolt from the blue to the cotton industrialists in Japan. For they are to be most hit by the abrogation of the treaty which will more than likely be followed by the levying of higher duties on the Japanese export to British India, especially the cotton manufactures.

The Japan Cotton Spinners' Association and all the other organizations of cotton manufacturers and dealers, in concert with other institutions interested in the promotion of Indo-Japanese trade, have exerted efforts to cope with the situation. Their efforts, however, have so far had hardly any favorable effect. For the latest development is that the British Government intends to denounce the existing commercial treaty between Japan and all the British colonial possessions, in addition to the Indo-Japanese convention of 1905.

It is generally known that the phenomenal development of Japan's cotton spinning and weaving industry, its powerful competition against the British manufacturers in the overseas market, and the unprecedented depreciation of the yen exchange rate are the main factors which have induced the British Government to contemplate the treaty abrogation.

It is not the main purpose of the present article, however, to take part in the controversy arising from the steps taken by the British Government. The present article has been written primarily to give statistics covering all the aspects of Japan's cotton industry, especially of recent years, with a few explanatory remarks attached.

Statistical Survey

At the end of 1932, there were 71 cotton spinning and weaving companies in Japan of which the combined capital stood at Y.540,561,100 (Y.397,674,627 paid up) and their total reserves amounted to Y.245,939,643. These companies operated 265 mills which were equipped with 7,929,530 ring and 35,320 mule spindles ; in addition, 810,492 doubling spindles and 79,277 looms.

Included among these 71 companies were eight which were not members of the Association. Their combined capital stood at Y.11,100,000 (Y.9,800,000 paid up) and they had Y.233,755 in reserves. Note the fact that the reserves of these eight companies are considerably small as compared with the aggregate total including that of the Association members, especially in proportion to their paid up capital. These non-member companies operated 116,356 ring (no mule) and 12,448 doubling spindles, and 2,686 looms.

A casual comparison of these figures outstanding at the end of 1932 with that of four preceding year-ends finds that Japan's cotton industry, which had shown steady improvement up to 1930, registered falls all round in 1931, but that it picked up again during 1932, as noted in the accompanying tables : (Unit : Y.1,000).

	No. of	*Capital*		
End of	*Companies*	*Authorized*	*Paid up*	*Reserves*
1932	71	540,561	397,674	245,939
1931	72	537,964	398,855	240,828
1930	74	561,989	425,346	252,094
1929	70	560,846	429,415	259,756
1928	70	552,196	419,792	249,678

End of	*No. of Mills*	*Ring*	*Mule*	*Doubling*	*Loom*
1932	265	7,929	35	810	79
1931	263	7,498	37	801	77
1930	263	7,171	42	803	79
1929	258	6,795	41	808	77
1928	259	6,425	41	809	81

Note.—Three zeros omitted in the number of spindles and looms of the foregoing table.

All the members of the Japan Cotton Spinners' Association monthly file full statistical reports on their respective actual operation of mills, and the general improvement of conditions in 1932 noted in the foregoing tables is substantially supported by these reports when the semi-annual totals and averages for the second half of 1932 are compared with that of 1931. Mention must also be made of the fact that at the end of 1932, the Association's membership was larger than that of 1931 by three ; it increased from 60 to 63. It is recalled also that the total number of companies at the end of 1932, which stood at 71, included eight non-members.

WORKING CONDITIONS

	First half, 1932	*Second half, 1932*	*Second half, 1931*
No. of Companies	61	63	60
Working spindles: (daily average)			
Ring	6,187,450	6,398,310	6,061,451
Mule	14,435	15,573	18,425
Total	6,201,885	6,413,883	6,079,876
Yarn Produced :			
Ring	68,551,560	68,659,924	65,421,821
Mule	208,357	184,131	296,001
Total	68,759,917	68,844,055	65,717,822
Average yarn output per day, per spindle :			
Ring	81.9	79.0	77.7
Mule	184.2	158.5	170.6
Cotton consumed	78,036,060	78,336,917	75,325,804
Cotton fly	7,993,885	8,291,214	8,635,159
Waste yarn	425,281	408,506	417,189
Coal consumed	95,705,472	73,707,758	97,164,739
Average price per 10,000 lbs. ..	Y.35.02	Y.33.25	Y.35.89
Actual horse-power used :			
Steam	7,759 h.p.	6,319 h.p.	8,382 h.p.
Hydro-electric and gas ..	208,240 h.p.	207,325 h.p.	191,293 h.p.
Coal consumed per h.p. per hour	2,983 lbs.	2,548 lbs.	2,834 lbs.
No. of hands :			
Male	21,645	20,663	23,143
Female	104,918	106,385	100,963

Note.—The unit used in the foregoing table are : kan, or kamme, for the yarn output, cotton consumed, cotton fly, and waste yarn. One kan equals 8.28 lbs. ; momme for average yarn output per day per spindle ; 1,000 momme makes one kan ; lbs. for coal consumption.

Japan's cotton spinning and weaving industry, like almost all the other manufacturing industries, showed remarkable progress during or after the Sino-Japanese War (1894-5), the Russo-Japanese War (1904-5) and the World War.

In sequence to the unprecedented boom that visited Japan during the World War, the number of companies increased by 15, the spindles, by approximately, 1,000,000 and the looms, 23,000.

Japan's master spinners and manufacturers, though they declared high percentage of dividends during and immediately after the World War, were cautious enough to be prepared for "rainy days" which eventually came ; instead of dividing all of their enormous earnings, they preserved a considerable portion of the profit.

With the exception of some new companies established during the boom, the old concerns that preserved their war boom profits materially improved the foundation of their business.

It was principally on account of this fact that the cotton spinning and weaving companies in Japan were able to hold their own and even make further developments, although they have had serious trouble on several occasions, after the cessation of the World War.

Included among the series of difficulties that Japan's cotton industry encountered include : (1) In the spring of 1920, the post-war crash delivered deadly blows to all the manufacturing industries in Japan and the cotton industry, too, suffered therefrom ; the market quotation of yarn collapsed and the stock accumulated. The cotton interests however, carried out drastic readjustment to cope with the crisis, the measures adopted including a country-wide settlement of all the then outstanding accounts at "made up" prices, and also, the organization of a national syndicate for limitation of operations. (2) In September, 1923, a most devastating earthquake occurred in the Tokyo-Yokohama district. The damage done to Japan's cotton industry in the quake afflicted area amounted to the loss of 400,000 spindles. The loss, however, was more than recovered by the end of the following year. (3) The nation-wide financial crisis of 1927 severely affected the weavers in the rural districts to such an extent that the spinners were badly hit. Japan's master spinners and manufacturers, however, pulled through all of these three major difficulties.

The number of spindles installed in the Japanese mills totalled 3,800,000 at the end of 1920. It increased to 7,200,000 at the end of 1930, and to almost 8,000,000 at the end of 1932.

Such a remarkable increase in the number of spindles has been brought forth partly due to the extension of the domestic consumption, but more on account of the export trade development. It is roughly estimated that Japan exports 60 per cent of the entire output, the remainder 40 per cent. being the estimated domestic consumption. That midnight operation was officially suspended in July, 1929 (a number of companies gave up the system several months previously), was also responsible for the increase, as the spinning mills were eager to maintain the standard of their output even after the suspension of midnight operation. That the number of spindles registered an abrupt increase during 1929 was mainly due to this change in the working system.

Speaking of working conditions : previous to the suspension of midnight operation, the spinning and weaving companies in Japan had two shifts of operatives, each of them working for 10 hours a day, and they had two-day holidays a month. Following the suspension of midnight operation, however, the two shifts of operatives had 17 hours a day to divide between them, and two day holidays a month. Two more holidays were then added in 1930 when the limitation of output was put into practice. In addition, the companies adopted the one shift system and the number of these companies went on increasing until it reached a stage where 600,000 spindles were operated under the one shift system. It reflected the aggravation of the market situation at its worst. As soon as the market situation improved, however, the two shift system was restored. To-day, most of the mills are operated on the basis of two shift system and four day holidays a month.

Cotton Consumption

The raw cotton consumption in Japan during 1932 almost tied with the heaviest record of 1929 as seen in the accompanying table : (Unit : 1,000 kan ; one kan equals 8.28 lbs.)

Kinds/Years	*1932*	*1931*	*1930*	*1929*	*1928*
Indian	40,109	70,265	75,912	77,822	61,793
American	109,933	68,192	56,702	68,408	61,893
Chinese	245	314	1,384	3,507	7,369
Egyptian	4,525	3,925	3,088	3,707	3,398
African	19	301	1,109	1,485	1,062
Anamese and Saigonese..	58	146	233	68	200
Chosenese	611	1,706	2,451	1,799	1,336
Total, including others ..	156,372	145,336	141,649	157,681	137,914

According to a report of the Federation of International Master Cotton Spinners and Manufacturers' Association, the raw cotton consumption during one year ending January, 1932, as well as its comparison with the number of spindles, were as follows :

Countries	*Quantities (1,000 bales)*	*Spindles (1,000)*	*Per 1,000 spindle consumption*
U.S.A.	5,413	32,290	167
Japan	2,720	7,572	359
B. India	2,606	9,312	279
China	2,298	4,093	561
England	2,200	52,776	42

Yarn Output

The accompanying table gives the annual output of cotton yarn in Japan during the past five years: (In 1,000 bales).

Years	*Low count*	*20s.*	*Medium*	*High count*	*Totals*
1932	796	896	957	158	2,810
1931	808	802	814	138	2,566
1930	780	807	833	100	2,524
1929	826	877	984	101	2,791
1928	720	736	906	86	2,451

The annual import into Japan of cotton yarn during the period under review were: 1932 : 28,586 bales ; 1931 : 115,533 bales ; 1930 : 9,052 bales ; 1929 : 5,238 bales ; 1928 : 3,663 bales.

As regards the export and the domestic consumption of cotton yarn in view of the fact that there is no way of knowing the domestic consumption, it is estimated by means of subtracting the volume exported from the total supply (output plus import). The following table gives the total supply, the export, and the estimated domestic consumption. (Unit : 1,000 bales).

Years	*Total Supply*	*Export*	*Estimated Consumption*
1932	2,838	88	2,748
1931	2,682	31	2,650
1930	2,533	58	2,473
1929	2,797	66	2,729
1928	2,455	70	2,383

Note.—The omission of figures under 1,000 bales necessarily results in minor differences in the balance of the above table as well as in the totals of other tables already given and that which will follow.

The 1932 export of cotton yarn according to countries was as follows : (Unit : in yen and 100 kin ; 300 kin makes one bale.)

Countries	*Quantity*	*Value*
Manchoukuo	5,601	499,950
China	11,019	692,325
Kuantung	10,171	670,077
Hongkong	24,504	1,336,998
British India	152,986	14,343,099
D.E.I.	21,978	1,445,070
Philippines	2,907	249,525
Siam	1,114	104,785
Egypt	5,301	325,957
Total, including others.. ..	268,816	21,546,681

Record Production

Japan's cotton yarn output in 1932 reached an unprecedentedly heavy total of 2,810,000 bales, which, compared with the 1931 total, represented an increase of nearly 10 per cent. The domestic consumption, however, was inactive especially during the second half of 1932 ; it registered a fall of a little more than 10 per cent compared with the 1931 total.

That the market situation was readjusted in spite of this record output and the inactivity in the domestic consumption was due entirely to the phenomenal progress of the export trade which resulted from the collapse of the yen exchange rate. The 1932 aggregate total export of cotton yarn (with the exported textiles and manufactures also converted into terms of yarn bales) amounted to 1,447,000 bales which was about 43 per cent. larger than that of 1931. The export was particularly active during the second half of 1932, so much so that the yarn supply was even apt to fall short of the demand. Since the beginning of 1933, however, the market witnessed adverse developments, the hectic export having been checked in sequence to the improvement of the yen exchange rate. The fall was particularly noteworthy in the textiles of which the activity during 1932 was mainly responsible for the prosperity of Japan's cotton industry, last year.

Cotton Textile

Semi-annual returns for the second half of 1932 show that on the average 42 companies operated 69,332 looms, producing 63.16 yards per loom per diem. The volume of cotton yarn consumed during the six months under review reached a total of 166,491,050 lbs., and the waste yarn, 1,490,995 lbs., while the mill hands employed, male, 5,334 and female, 26,234, per day.

Compared with the preceding six months, or the first half of 1932, as well as the corresponding period of 1931, there were all increases. The following table gives the working conditions of the cotton weaving mills for the past five years :

	No. of companies	*Looms*	*Per loom per day output (Yard)*	*Yarn consumed (1,000 lbs.)*	*Waste yarn (1,000 lbs.)*	*Mill hands (per day)*	
						Male	*Female*
1st half, 1932 ..	41	66,725	64.74	159,416	1,446	5,425	23,797
2nd half, 1932 ..	42	69,332	63.16	166,491	1,490	5,334	26,234
1st half, 1931 ..	42	63,817	62.01	146,313	1,360	5,988	23,047
2nd half, 1931 ..	41	64,967	62.88	154,918	1,380	5,636	23,000
1st half, 1930 ..	—	67,571	62.97	160,941	1,552	8,186	31,810
2nd half, 1930 ..	—	62,767	57.08	135,651	1,238	6,607	24,103
1st half, 1929 ..	—	70,210	67.07	167,448	1,588	8,598	34,873
2nd half, 1929 ..	—	67,070	62.97	168,827	1,664	8,371	33,544
1st half, 1928 ..	—	68,601	64.73	145.127	1,421	8,115	35,390
2nd half, 1928 ..	—	72,611	64,97	157,880	1,529	8,404	35,503

The annual output, export, and import of cotton textiles for the past five years were as follows :

Years	*Output (1,000 yards)*	*Export (Y.1,000)*	*Import (Y.1,000)*
1932	1,532,850	288,712	4,130
1931	1,404,668	198,731	4,375
1930	1,388,423	272,116	4,999
1929	1,538,249	412,706	8,574
1928	1,382,034	352,217	7,434

The principal countries to which Japan exported the cotton textile during 1932 are as follows: (Unit: 1,000 square yards and Y.1,000).

	Quantity	*Value*
Manchoukuo	8,971	2,192
China	193,623	38,229
Kuantung	188,838	16,149
Hongkong	23,406	3,755
British India	644,685	80,653
Straits Settlement	82,228	11,229
D.E.I.	352,234	50,228
Philippines	21,410	2,769
Siam	24,458	3,338
Turkey	41,529	5,574
U.S.A...	1,646	264
Chili	1,263	193
Argentina	22,461	3,300
Uruguay	396	55
Egypt	195,435	27,068
South Africa	36,316	5,338
Australia	35,992	4,874
New Zealand	1,238	181
Hawaii	1,152	168
Total, including others.. ..	2,031,722	288,712

Note.—The foregoing table does not include the export of cotton blanket, cotton handkerchief, cotton towel, shirts made with knitted goods and cotton crepe, and sewing thread.

The import into Japan of cotton manufactures during 1932 was as follows : (Unit : 1,000 square yards and yen).

Countries	*Volume*	*Value*
England	4,149	2,080
France	71	55
Germany	50	52
Switzerland	5,609	1,796
U.S.A...	107	69
Others..	121	76
Total	10,109	4,130

Note.—The foregoing table does not include the volume and quantity of cotton cloth for book binding nor sewing thread.

JAPAN'S RAW COTTON RE-EXPORT

Years	*Volume (100 kin)*	*Value (Y.1,000)*
1932	956,282	34,111
1931	552,675	15,788
1930	470,359	22,216
1929	477,469	28,762
1928	589,748	37,436

YARN AND TEXTILE RE-IMPORT

Years	*Cotton Yarn*		*Cotton Textile*	
	Volume	*Value*	*Volume*	*Value*
1932	17	Y.1,231	1,698	Y.291,576
1931	178	13,156	826	129,578
1930	512	47,048	954	216,593

Note.—The unit for the cotton yarn re-import is 100 kin and yen while that of textile is 1,000 square yards and yen.

The cotton weaving industry in Japan is of ancient origin. It developed as a side enterprise of farming houses where hand and foot driven looms were operated side by side with the primitive hand operated spinning machinery which spun domestic raw cotton. Following the introduction of the modern power-driven spinning machinery about half a century ago, the weaving industry, too, made considerable progress. Nevertheless, the market was still confined within the Empire for a long while, partly as the domestic consumption of textiles steadily increased in line with that of production.

It was after the Sino-Japanese War (1894-5) that Japan began exporting cotton textiles. Once the export started, the trade made a substantial development, especially after the Russo-Japanese War (1904-5). Meanwhile a great opportunity presented itself during and immediately after the World War ; the English weavers, during the War, were unable to attend to their export while the American trade with China had been declining since 1907. It was but a natural outcome that Japan's cotton textile export should make a meteoric progress under such favorable circumstances.

The Japanese cotton manufactures found their way not only to British India but also to South Seas Islands during the World War. The volume re-export from British India to African east coast, too, amounted to heavy totals. Although Japan lost the Chinese market for cotton yarn, she thus obtained new market for finished goods. And the prosperity lasted well after the World War in spite of the world wide depression, as the Japanese weavers managed to hold the market that they found during the World War, and moreover, as their market was further extended. To-day, the Japanese cotton manufactures find their way almost to all the corners of the world, although the principal market is still limited to China, British India, Dutch East Indies, and African countries.

The Japanese cotton spinning companies, in the early stage of their development, had no time to devote their attention to the weaving enterprise. It was after the Russo-Japanese War that they began making serious efforts in this sphere of industry. In 1904, the spinning companies operated about 5,000 looms. Five years later, or in 1909, the number of looms increased to 13,000. In 1914, it totalled 24,000. At the end of 1932, they operated 79,277 looms, the total including 2,686 looms belonging to non-members of the Japan Cotton Spinners' Association. Such remarkable increases in the number of looms were due partly to the progress in China of the cotton spinning industry.

Japan's cotton yarn export to China was severely affected in sequence to the progress of the industry in that country. It necessarily resulted in the production of higher counts of yarn in Japan, but at the same time, it encouraged the spinning companies to run side by side the weaving enterprise. This tendency became all the more notable during and after the World War. At the end of 1932, there were 42 companies which undertook weaving.

Another noteworthy phenomenon is that the variety of textiles produced by these spinning companies has shown considerable increases. Their produce now cover almost all the kinds of cotton manufactures produced in Japan to-day, including those which were turned out only by specialized weavers until a few years ago.

The development of the weaving industry, especially since the spinning companies' participation in it, the number of small weaving mills such as those operating less than a dozen looms, has greatly decreased.

China Year Book, 1933

An event noteworthy to all those having interests in China is the appearance of the new (fifteenth) issue of *The China Year Book*, edited by Mr. H. G. W. Woodhead, C.B.E. The new volume is about the same size as the previous edition, but the entire contents of about 850,000 words have been revised or rewritten.

A number of Chapters have been revised or written by acknowledged experts. These include : *Climate*, by Father Gherzi ; *Public Health*, J. B. Grant ; *Mongolia*, Owen Lattimore ; *Catholic Missions*, Father D'Elia ; *Labor*, Dr. Ta Chen ; *Mineral and Mines*, Dr. W. H. Wong ; *Chinese Art*, Dr. J. C. Ferguson ; *Currency, Banks, etc.*, E. Kann ; and the *Kuomintang, Chinese Government, Who's Who, Finance, Education, Public Justice, International Issues*, and *City Government of Greater Shanghai*, by Dr. M. T. Z. Tyau and his colleagues Mr. C. A. Pao, Dr. S. G. Cheng, Dr. T. T. Lee, Mr. D. C. Hsiang, Mr. C. Lu, Mr. T. T. Yin, Mr. C. S. Ho and Mr. M. H. Ting.

Revision of the Chapters on the *Post Office and Telegraphs and Wireless* was undertaken by the Staff of the former, and the Director-General of Telegraphs.

The Editor was responsible for the revision, mainly on the basis of official documents and information, of the Chapters on *General Information, Revenue and Trade, Products, Colonies, Leased Territories and Concessions, Trade and Commerce, Imports, Greater China, River Conservancy, Railways, Army and Navy, Shipping and Miscellaneous.*

The new features to which special attention may be drawn are the Chapers on Greater Shanghai, Chinese Art, and Catholic Missions.

Matters to which special attention may be directed are : the seizure of the Customs in Manchuria, Consular Invoices, Financial Reports, 1930-2, Abolition of the Tael, Banking Laws, the Sino-Japanese Dispute, Resumption of Sino-Soviet Relations, the City Government of Greater Shanghai, Insurance in 1932, State Lotteries, Merchandise Marks, and the new Import Tariff. It is gratifying to note that less space has to be devoted in this issue to civil wars in China, and that certain controversies, such as the revision of so-called Unequal Treaties and Extraterritoriality find no mention.

The China Year Book is published by *The North-China Daily News & Herald, Ltd.*, of Shanghai, price Mex. $20.

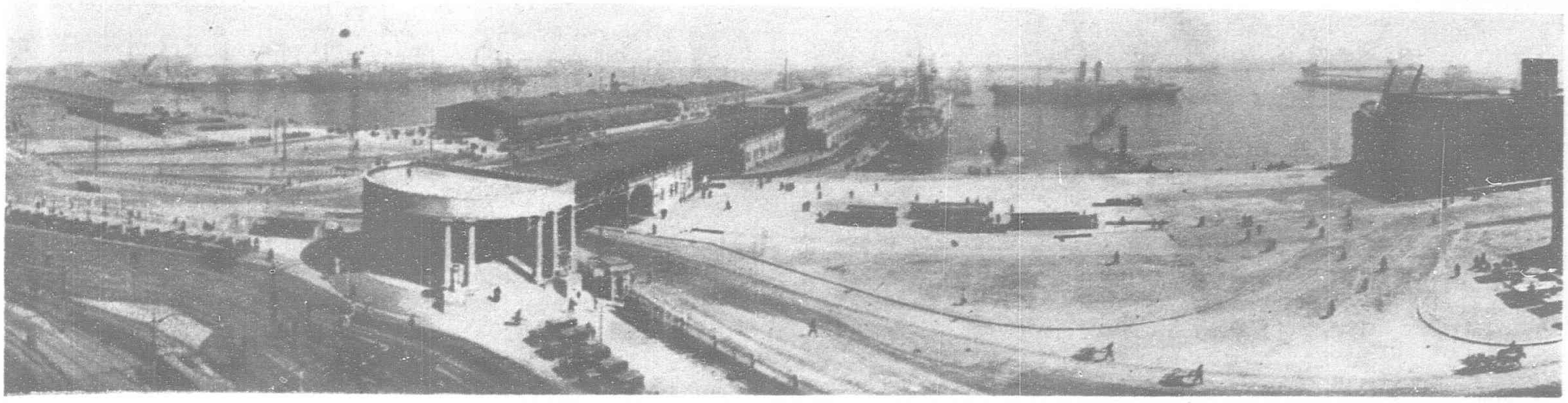
Many New Small Factories in Japan

As a result of the industrial activity in Japan during 1932, a large number of small manufacturing concerns have been established, particularly in the industrial center of Osaka and around Tokyo, reports Assistant Commercial Attaché W. S. Dowd, Tokyo. According to the Tokyo metropolitan police board, the net gain in small factories in Tokyo during the six months ended November 1932 totaled 311, while Osaka statistics indicate an increase of approximately 1,000 in that city during 1932. Only about 4,600 additional people, however, were employed by the new factories in Osaka.

Industries showing the greatest increase include metal, machinery, electric, gas manufacturing, printing, dyeing, and spinning. In Osaka, the metal-working trade accounted for 246 new plants during the year, and those engaged in work connected with the production of small cast iron pipe and aluminum utensils increased by 175. There were 83 more small plants producing electric bells and batteries, special mechanics' tools, and agricultural instruments, and 39 more, producing items used by shipyards and car foundries.

The Japanese Cotton Spinners' Association reports that the number of spindles in its mills throughout Japan increased during 1932 by 472,516, bringing the total to 7,848 494—reported as the greatest advance in any single year since 1928, when additional spindles had to be installed to maintain capacity after the regulations prohibited night work.

Government figures include only factories having five or more operatives, and a very large number of small organizations of the household type are operated by less than five people. Factories having more than five operatives, however, increased from 44,590 on January 1, 1932, to 46,881 by the end of the year. This figure compared with 42,008 factories on January 1, 1931, and 39,660 on January 1, 1930.



Bird's Eye view of Dairen Harbor

Manchoukuo and Engineering Developments

By *J. N. PENLINGTON in "The Engineer"*

Last year a flood of publications, from substantial volumes issued in London and New York to pamphlets from societies such as the League of Nations, Association of Japan, endeavored to present the Chinese and the Japanese positions, and enlighten the world on the causes, present and remote, that culminated in a sudden explosion which overnight transformed large areas of the Three Eastern Provinces (Tung San-hsing) into a battlefield, resulting in the space of six months in the complete dispossession of the old rulers and the creation of a new state, independent of the Republic of China, with a new capital removed from the old centers of intrigue and conflict.

Central Circle City of Dairen

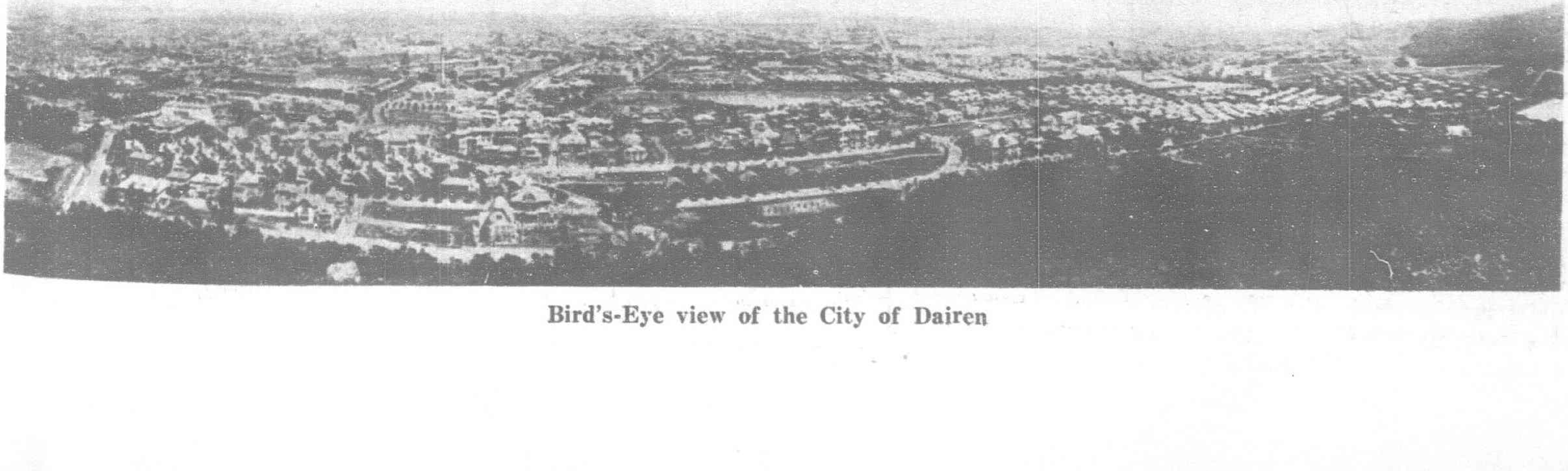
The chief creditors of Manchuria are the Japanese Government and people, not only in respect of money lent, but in regard to numerous enterprises, many on a co-operative basis, in which Chinese are claimed to have defaulted, or which were abandoned because of lawless conditions prevailing and the obstacles placed in the way of exploitation by local officials. Extraordinary tales could be told of lumber, pulp, and other industrial enterprises, started under apparently the brightest auspices and involving large preliminary outlays of capital, being gradually destroyed and finally abandoned because of exorbitant official demands and corrupt practices. Some of these enterprises, initiated years ago, will make a new start under the Government of Manchoukuo. Obligations of the old Government to Japanese semi-official banks (loans guaranteed by the Japanese Government), and debts due to the South Manchuria Railway Company, which has financed several Chinese railways, are well in excess of 10 millions sterling, and on these interest has never been paid, nor has any part of the principal been repaid.

Of other nationals who are creditors of the late Government at Mukden, the Germans were heavily interested in the huge arsenal established by Chang Tso-lin and extended by his son, while American firms are creditors for electrical installations in the towns.

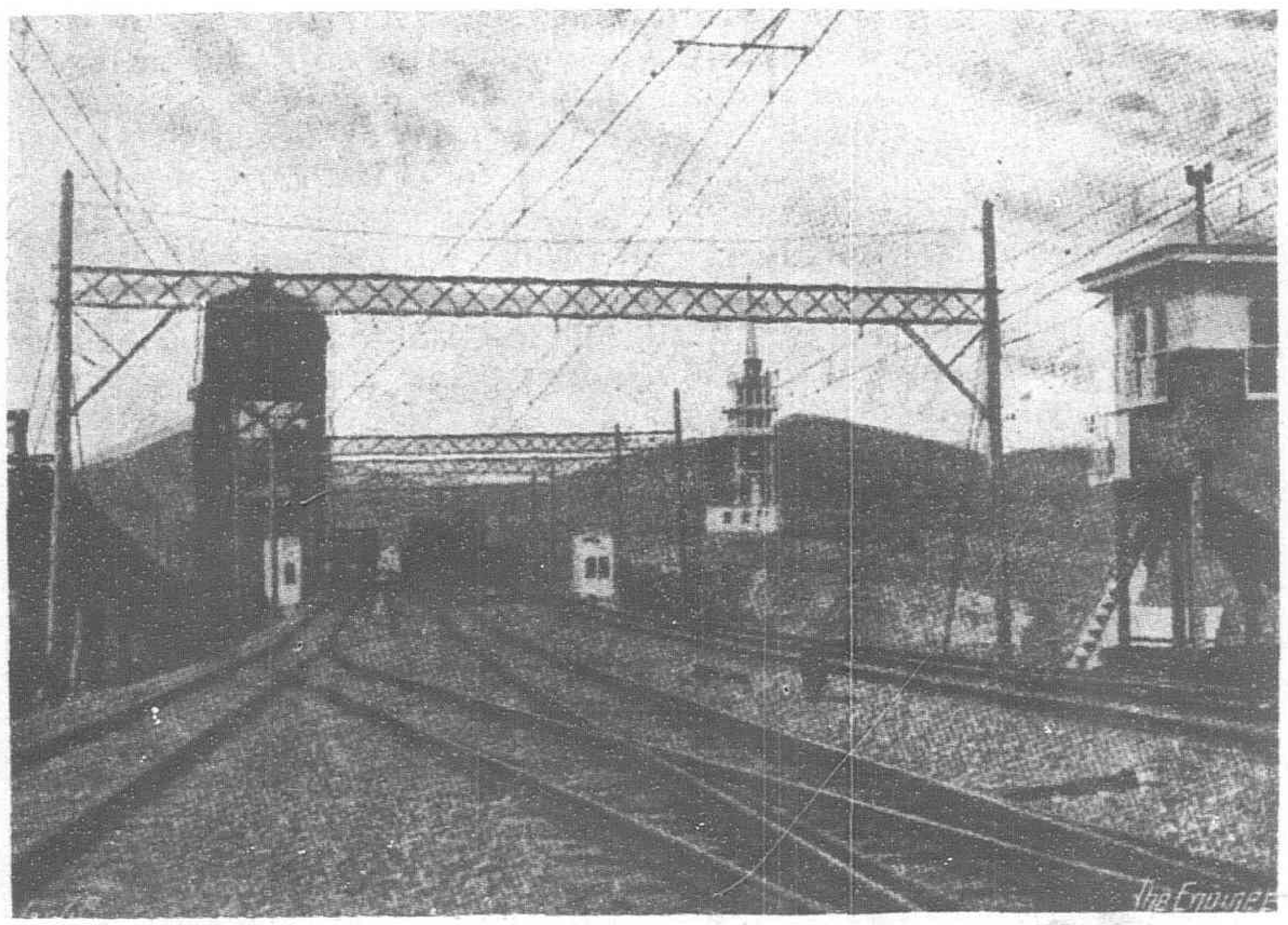
Railway Developments

The transformation that has taken place in Manchuria, while being the subject of severe criticism in some quarters, has brought with it certain decided advantages from which the people must benefit. One of the chief causes of Sino-Japanese rivalry were ill-considered plans for railway building. The projected lines numbered no less than thirty, and of these several have been completed. The Chinese object was to create a network of lines converging on the port of Hulutao, 50 miles due west of Newchwang, which was spoken of as a coming rival of Dairen.

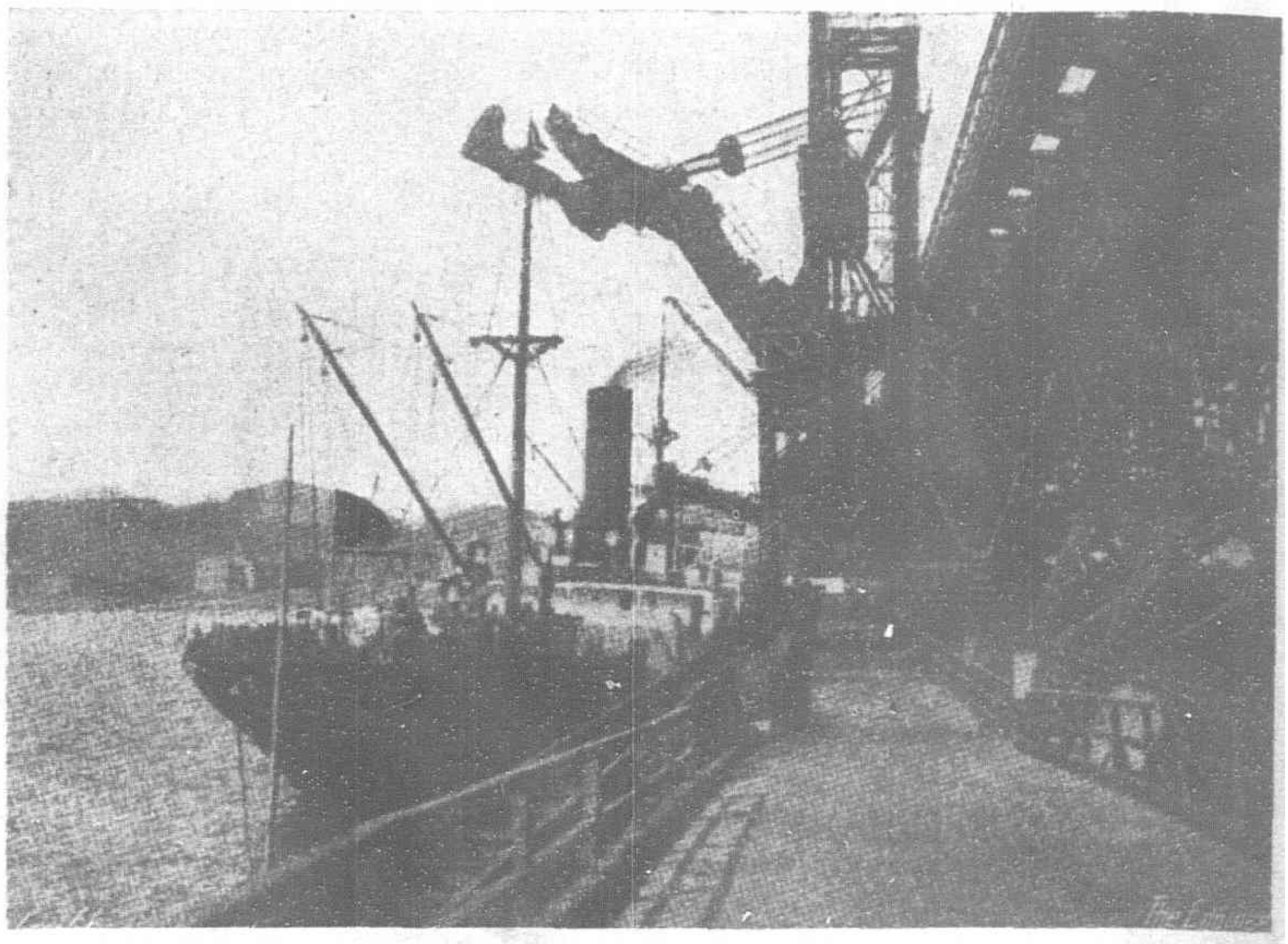
There is no reason whatever why the Chinese should not do everything possible to develop the hinterland of the port of Hulutao which can be done without injury to Japanese railway interests. The Netherlands Harbor Works Company at last report was



Bird's-Eye view of the City of Dairen



Kanseishi Coaling Yard



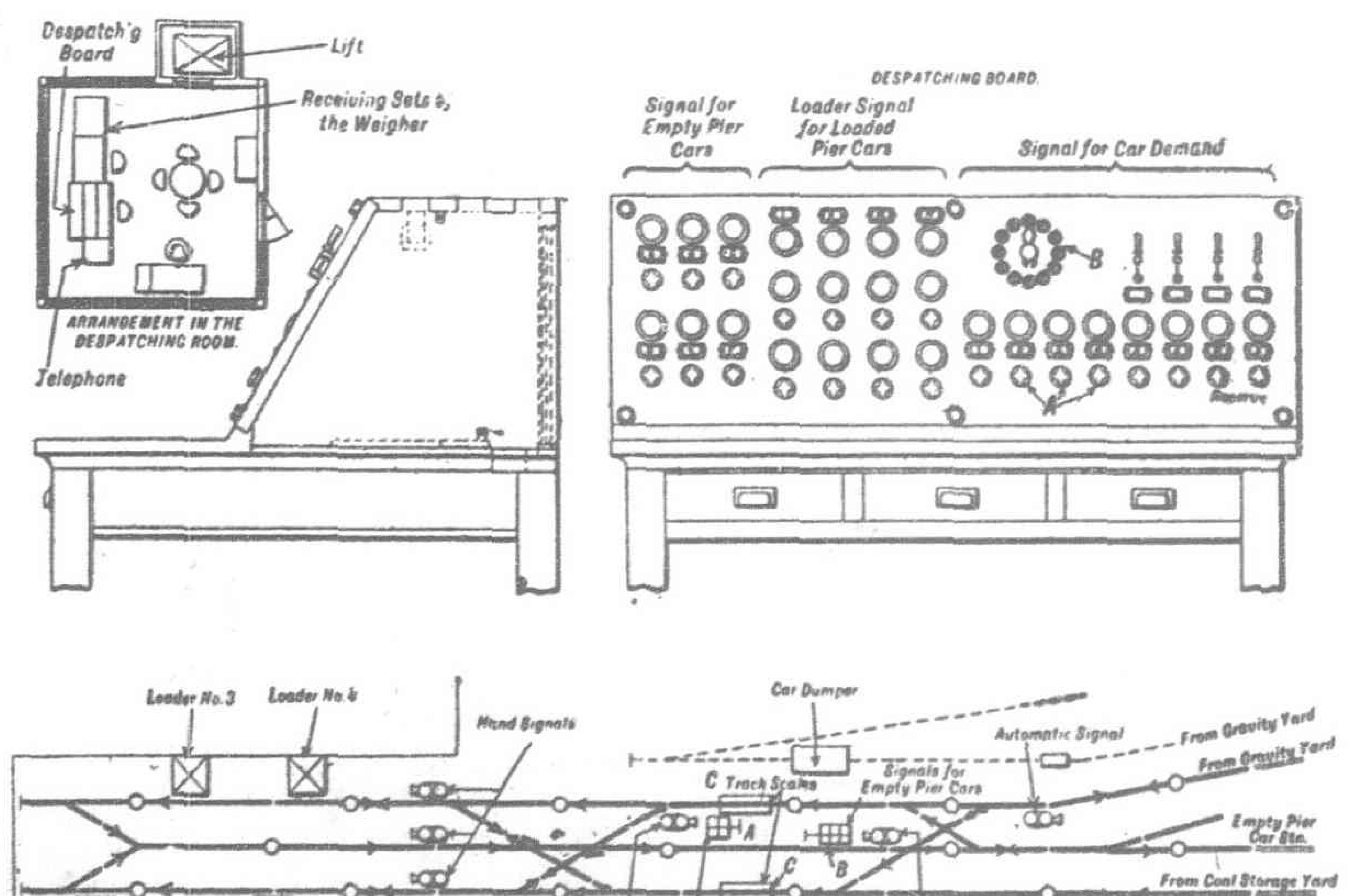
Kanseishi Coaling Wharf

proceeding with the construction of the breakwater, and although work has been interrupted more than once by strikes owing to non-payment of wages by the directorate of the Peking-Mukden Railway, ships are loading coal, and the port is in being, awaiting increased communication with the interior. Hulutao must grow as Dairen has grown, though in view of the huge expenditure incurred in equipping Dairen, years must pass before Hulutao can be anything like the rival the Chinese promoters hope it will be. Dairen ranks second in the list of ports of the Chinese Maritime Customs, having passed Tientsin some years ago.

Given good government, however, the prospects of Hulutao are bright. In view of the well-known disabilities of Newchwang, the oldest open port of Manchuria, frozen in winter and capable only of taking vessels of light draught, there is no adequate outlet for the produce of the Liao Valley, which the Shantung and Hopei immigrants are rapidly transforming from a pastoral to an arable country. The new conditions are bound to bring about great changes in this part of Manchuria, and make necessary a fresh attempt to improve the port of Newchwang. Twenty years ago, the Chinese authorities had the channels of the Liao River surveyed by the firm of the late Sir John Wolfe Barry, and in 1915 the result of these investigations was published, but nothing was done. Newchwang is the natural outlet of the valley, and it may be that the new Government at Changchun will consider the proposals made twenty years ago for the improvement of the delta.

Communications the Vital Need

It is commonplace to say that good means of communication, by road, rail, and sea, are the crying need of China—of all parts of the 4,000,000 square miles comprising the eighteen provinces and dependencies. Stable rule must also be postulated. Now, what appears to be a condition not to be expected in China proper actually seems in fair prospect of realization in Manchuria. Money is scarce, but labor is cheap and plentiful, and the authorities are determined to put the bandits to work on the roads. In this land of 400,000 square miles there are opportunities for a process of re-creation under conditions that only obtain south of the Great Wall in the exterritorial areas. Official plans for rail and road communication will, within a decade, work a quiet revolution in the life of the people, and the day may soon come when the Chinese fortress-farmhouse will disappear from the landscape, a few remaining to be pointed out as the remains of old castles are now studied by the archæologist. The bandit will pass with good government and improved economic conditions.



Dispatching Board and Plan of Yard

Such being the prospect, ancient centers of trade, long dormant, must revive, and regions now remote become productive and prosperous. A development of the whole country, comparable to the remarkable transformation during the past twenty-five years within the railway zones, may reasonably be expected of an agricultural people of tireless industry, whose chief need is the assurance that they themselves, and not tax officials or merciless bandits, will possess the product of their labor.

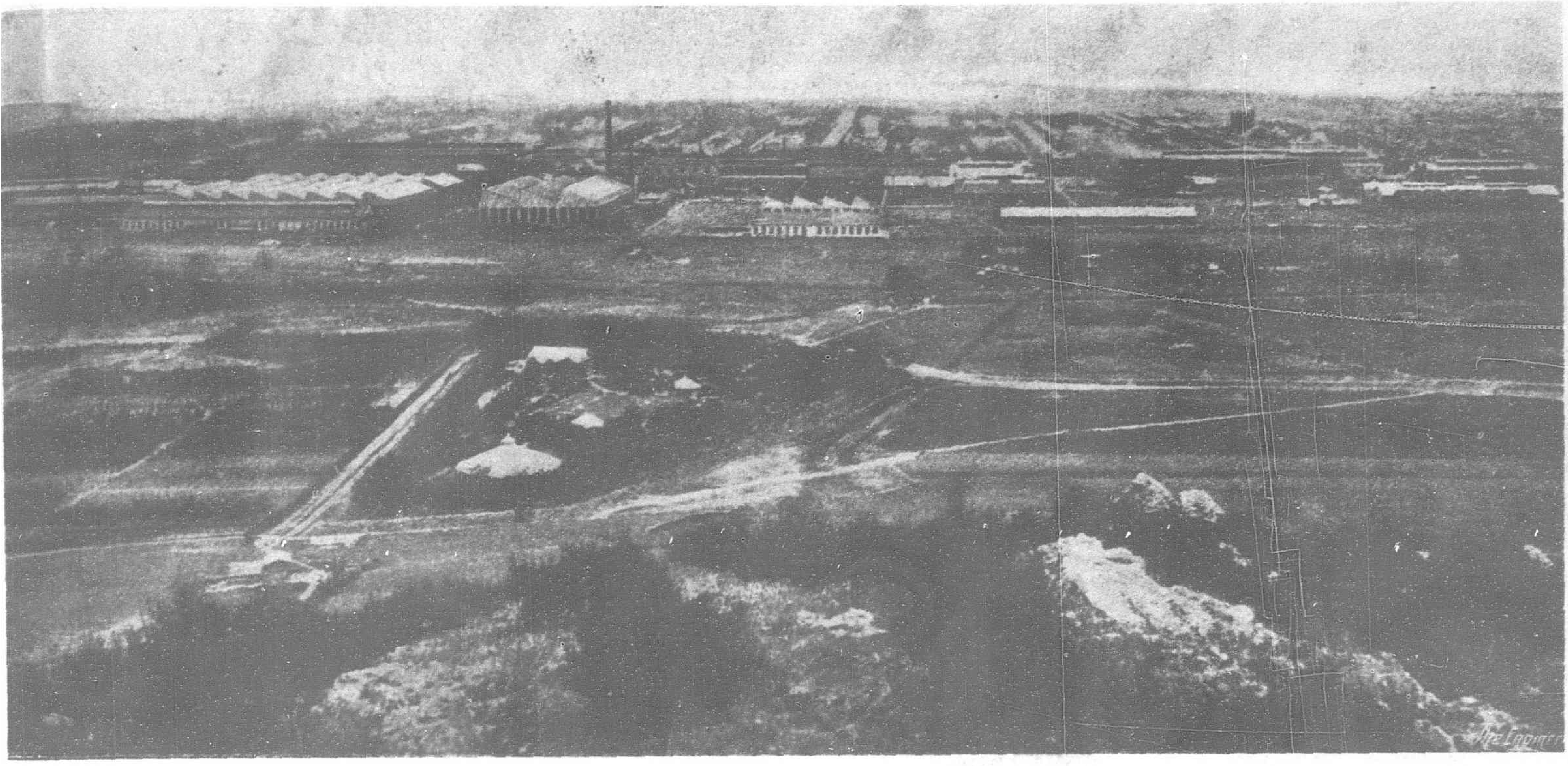
Mukden and the better-known towns of the south, where there is little agriculture, are rapidly becoming industrialized. The Japanese military authorities, at the outset of the recent disturbance, saw the necessity of motor roads, and all towns are to be connected by the ubiquitous motor omnibus. In Manchuria, as in Japan, the infant automobile industry, under military direction, is concentrating upon the production of serviceable omnibuses, trucks, and cars, uniform in type, in order to facilitate production.

It is in the north-east, north, and west of the Manchurian area, upon the great plains and in virgin forests, that the eye of the exploiter is turned, where opportunities present themselves to capital and industry, where development has repeatedly been attempted, and development work—real pioneer work—abandoned, often hastily, because of conditions that seem almost inherent in life in Manchuria.

Enterprise and Foreign Capital

Since the formation in 1907 of the South Manchuria Railway Company, research work has been carried on systematically by several agencies, including the research office of the company at headquarters in Dairen; by the Eastern Asia Economic Investigation Society in Tokyo, which is affiliated with the company and was for many years under the direction of a German; by the Central Laboratory at Dairen, under Japanese direction, an institution that has rendered invaluable service to agriculture and other industry; and by the several experiment stations for agriculture and animal industry, the chief of which is that at Kungchuling, some 25 miles south-west of Changchun. These are scattered over a wide area.

One other research body was established in 1931. This



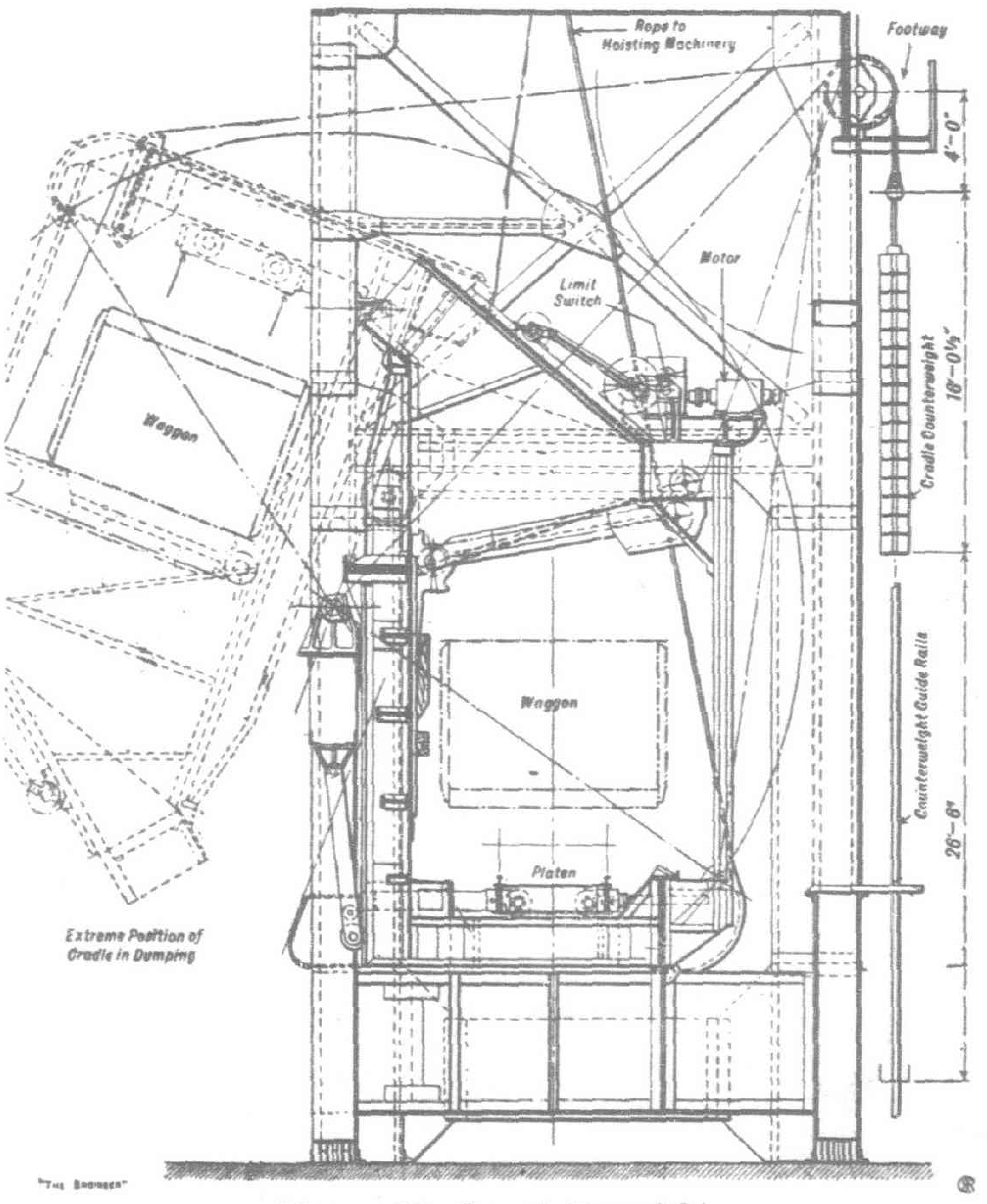
The Shakako Railway Works—South Manchuria Railway

is the Technical Board of the railway company, its head being Baron Chuzaburo Shiba, Doctor of Science and Engineering, Director of the Aeronautic Research Institute in Tokyo, Chairman of the Board of Directors of the Imperial Japanese Marine Corporation, and a member of the House of Peers. The object of the new institution, now functioning at Dairen, is the fullest development of the natural resources and industrial possibilities of the Manchurian area.

In regard to the latter, rationalization is the keynote. At the present time there are in course of formation large steel works, for which Government permission has already been obtained, and fertilizer and soda-manufacturing companies; other enterprises are in the initial stages, and where there is delay that is due to causes beyond control—the general depression and the political situation.

The Technical Board will devote its attention to the improvement and rationalization of the undertakings of the railway company—harbors, mines, ironworks; will study proposals for new engineering and other enterprises, keeping always in view reorganization from the industrial standpoint. There are many subsidiary concerns in which the parent company is financially interested, and in several instances these have made heavy demands upon the profits of the railway which, until the outbreak of September, 1931, were always large, far in excess of profits realized by railway companies in Europe and America. Such undertakings will come in for the close attention of Baron Shiba and his colleagues, whose board may be likened to the general staff of an army, making the best disposition of the industrial body, directing the forces to best advantage.

Considerable preliminary work had been accomplished by the Board before the unfortunate incident of September, 1931, threw everything for the time being into a disordered state. It was officially organized in July, 1931, and Baron Shiba spent the whole of that summer in travel through Manchuria and Korea and in the examination of sites and plants. While the incident at Mukden caused some upset of plans, the work of co-ordination of industry is proceeding, and Baron Shiba and his colleagues consider the general prospects, and the co-operation with the Chinese so long desired, now of the brightest.

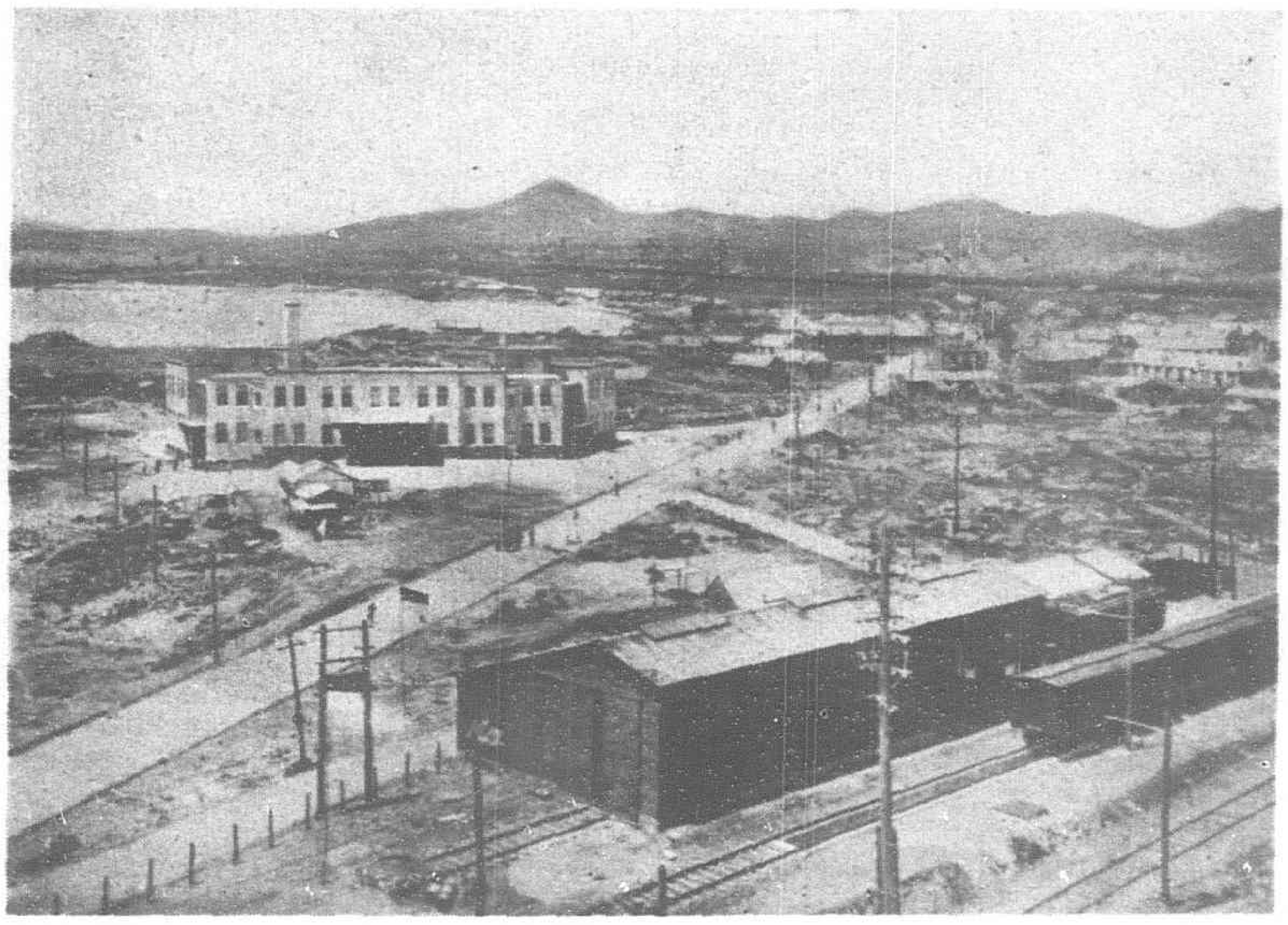


Wagon Tippler at Kanseishi

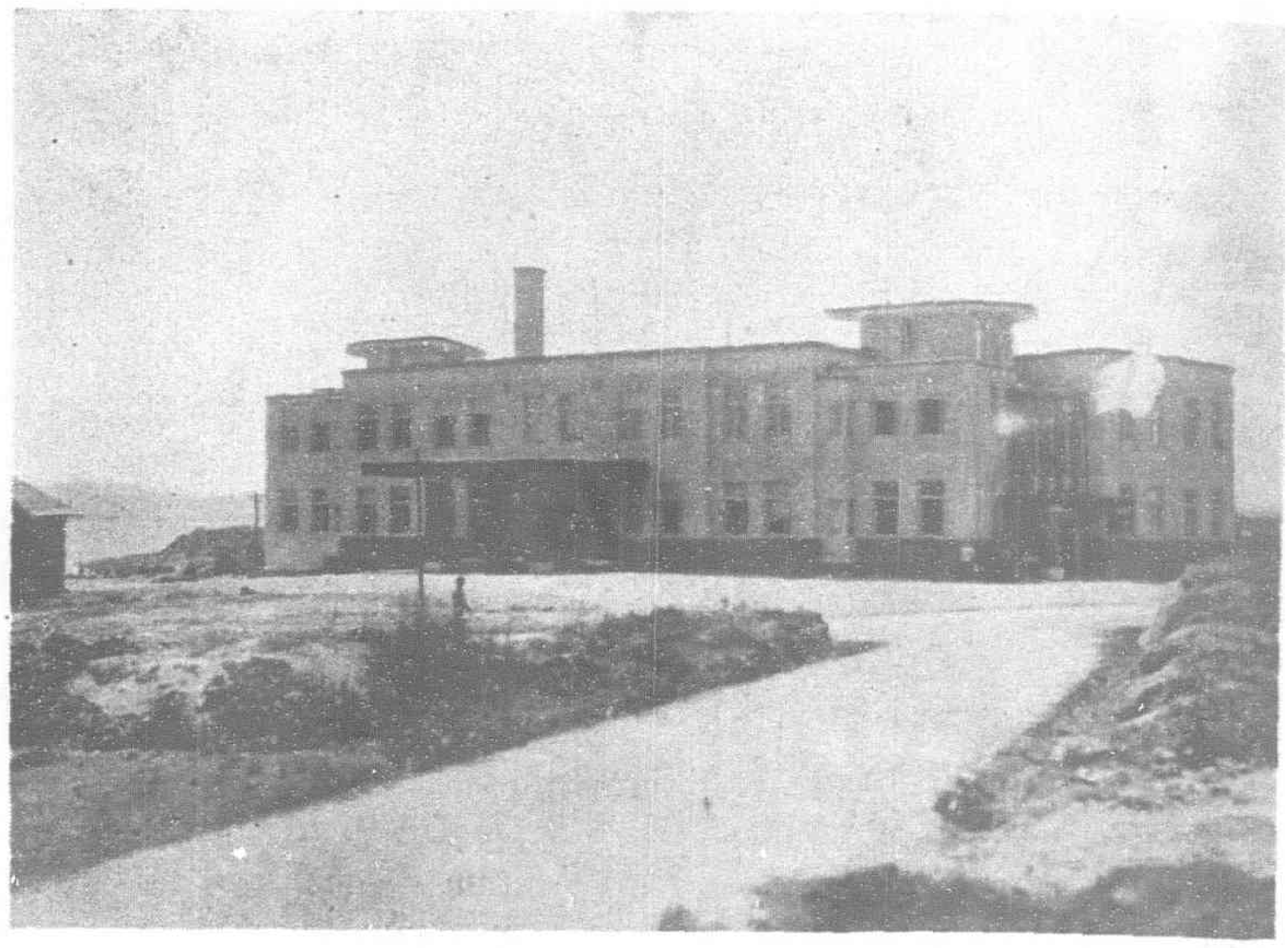
The "Open Door" in Manchuria

On July 13 last the Foreign Secretary, replying to a question in the House of Commons, said he had received no information to show that British trade in Manchuria was being penalized.

In the Kwantung Leased Territory and the narrow railway areas the Japanese took over from the Russians, the Chinese were, and actually still are, the dominating partners in trade. The Chinese population in some 1,400 square miles of territory under Japanese rule is over a million, whilst the Japanese number some 200,000. Other nationals trading in Manchuria have the same opportunities that they possess in Japan, which has never been a Free Trade country, and has always, by official control and restriction, sought to regulate the currents of trade for the national benefit. The Free Trade spirit that once ruled in England never gained the slightest footing in Japan; the whole relationship of Government and people is different, the latter being dependent upon Government to a degree inconceivable to the English people. In Manchuria, the Japanese remain the same; the system of government the same, and the people equally



General view of Kanchentzu where Kansheshi Coal Pier is Located



Showing Office of Kansheshi Coal Pier Depot, built in 1930

dependent upon authority for guidance in their affairs and practical assistance in times of difficulty.

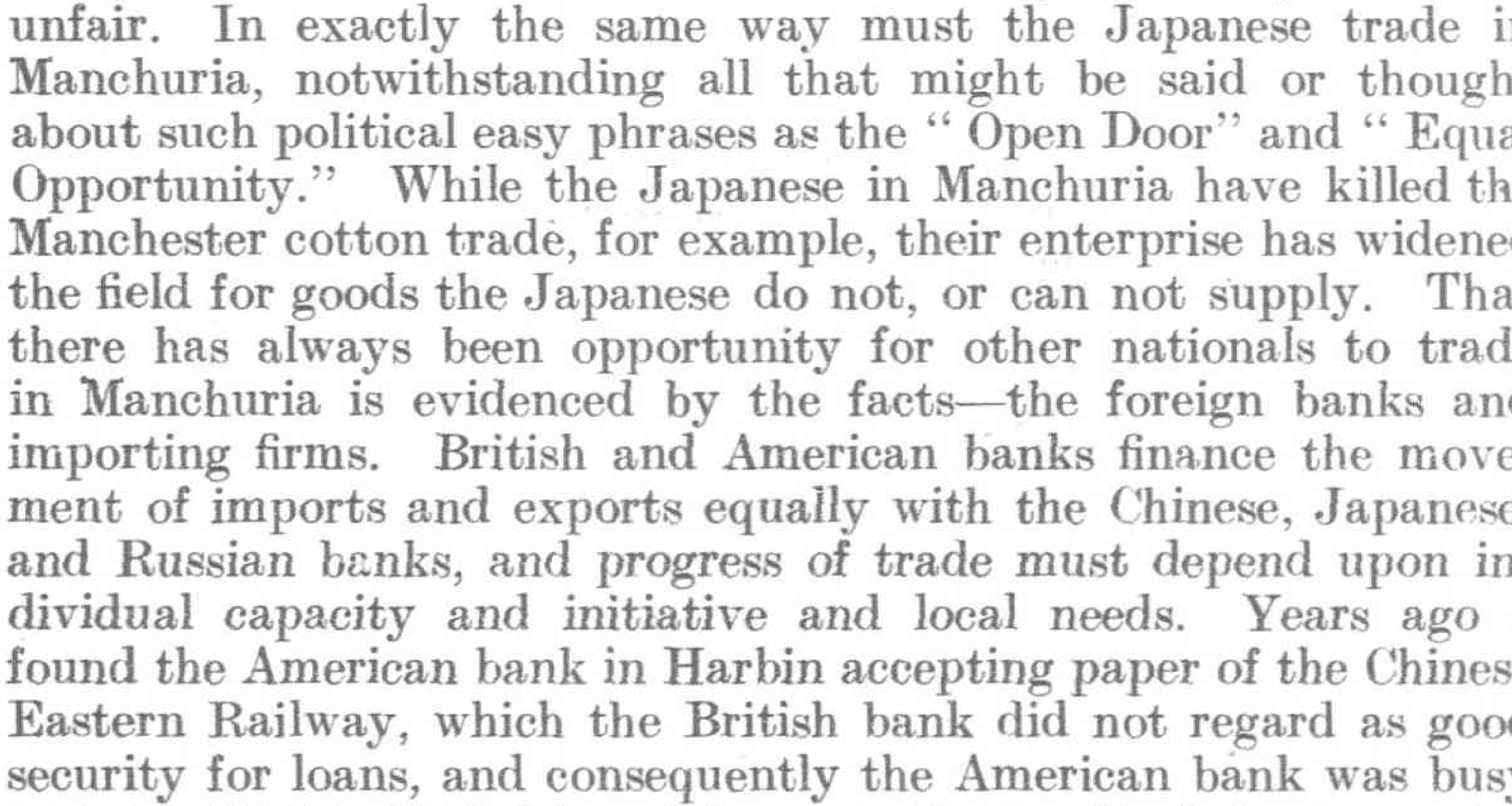
The Japanese have been nearly thirty years in Manchuria, but they will admit they have never been, and are never likely to be, the equals of the Chinese in capacity for trade. Where the Japanese succeed, as in the Indian cotton trade, we see the result of combination and well-considered plans, aided, if not initiated, by Government and maintained by methods which the individualist British trader, unaccustomed to official help, naturally considers unfair. In exactly the same way must the Japanese trade in Manchuria, notwithstanding all that might be said or thought about such political easy phrases as the " Open Door" and " Equal Opportunity." While the Japanese in Manchuria have killed the Manchester cotton trade, for example, their enterprise has widened the field for goods the Japanese do not, or can not supply. That there has always been opportunity for other nationals to trade in Manchuria is evidenced by the facts—the foreign banks and importing firms. British and American banks finance the movement of imports and exports equally with the Chinese, Japanese, and Russian banks, and progress of trade must depend upon individual capacity and initiative and local needs. Years ago I found the American bank in Harbin accepting paper of the Chinese Eastern Railway, which the British bank did not regard as good security for loans, and consequently the American bank was busy and the British bank idle. Whatever the result of the respective policies of these banks, the hard fact remains that enterprise is necessary to successful trade, and where there is enterprise there must be risk. The lordly days which made great fortunes for British hongs in China are past and gone. There are now a dozen nations equally competent and equally keen to trade in China where formerly there was one, and each man must put his dignity in his pocket and go after the business.

In view of the patent fact that the whole world, under pressure of circumstance, is busy to-day closing open doors, adding restriction to restriction, each lessening the opportunities of the individual trader, it is necessary that the department store idea be applied to commerce and industry, or the missionary-society method. It is necessary that such a market as Manchoukuo should provide in the coming years be deliberately studied and worked by a great organization, with ample capital, and technical—and, I would add, diplomatic—skill. Japanese trade in the past twenty-five years has been built up entirely by Government initiative and direction, and the system that has made this Empire one of the five Great Powers is not likely to be abandoned. It cannot be unwise advice to say that in order to succeed in the new Manchuria, it is necessary to take a leaf out of Japan's book and study the new field in a comprehensive way. In the East, the day of the individual in trade is passed ; he must be part of a large and influential organization capable of dealing with Government, which is the greatest trader, in Japan, in Manchuria, and in China proper. Despite the feeling of enmity and rivalry that exists, the authorities of Nanking, Canton, and other areas watch Japan closely and copy her methods in trade and industry. In the years to come the world will have to reckon with a more formidable competitor than the Japanese ever were.

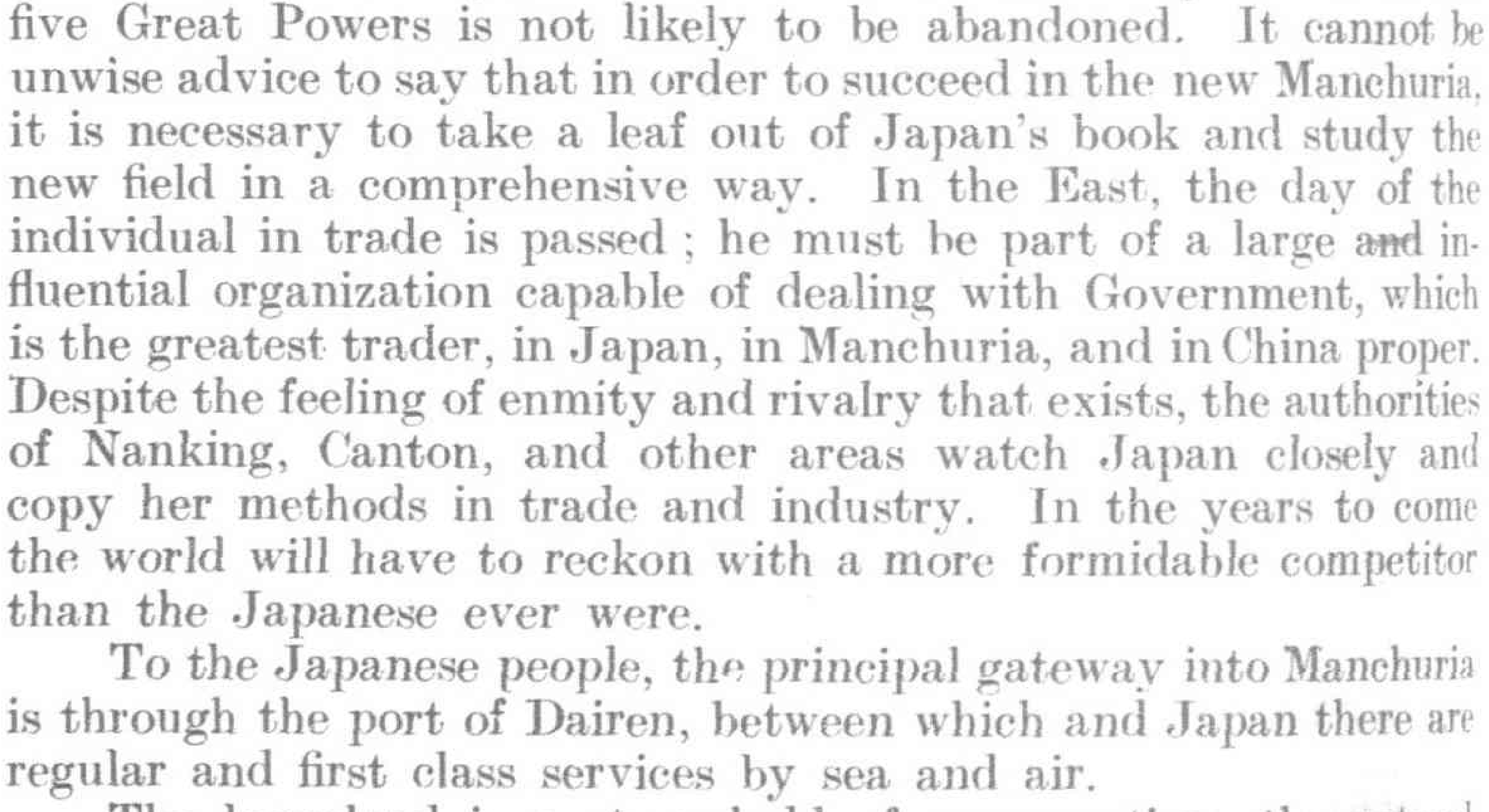
To the Japanese people, the principal gateway into Manchuria is through the port of Dairen, between which and Japan there are regular and first class services by sea and air.

The homeland is a stronghold of conservatism, the natural result of age-old traditions confirmed by an ever-growing population that cannot properly be fed and housed. But abroad, on the Asiatic mainland, amidst a race from whose early civilization the islanders have taken so much, they are becoming another people.

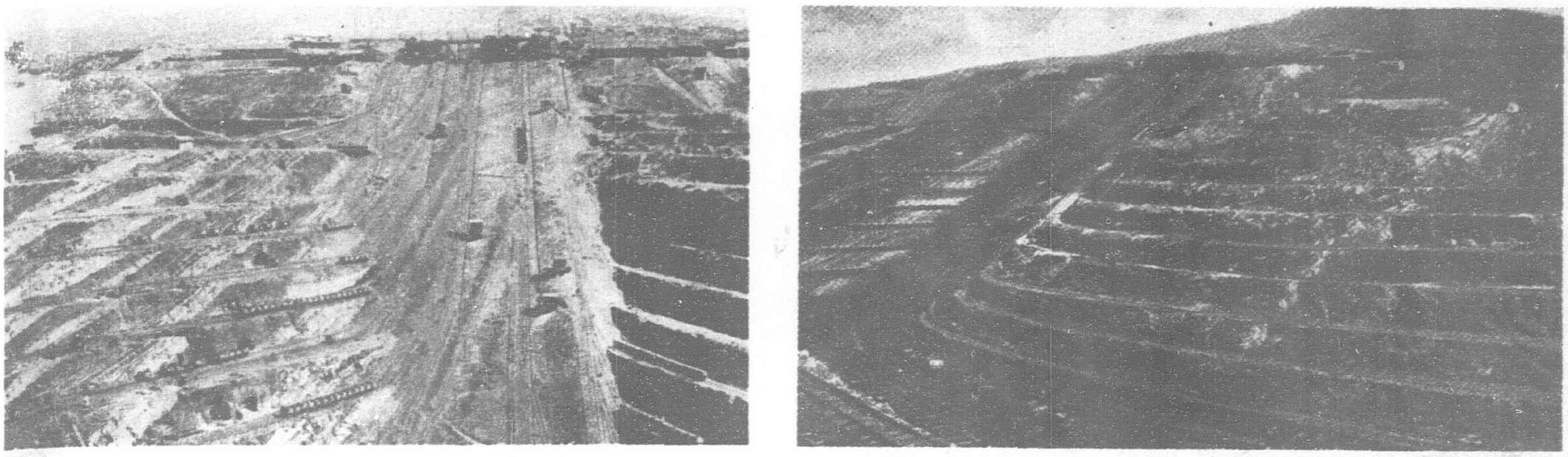
The Japanese in Manchuria are conscious of their Imperial mission. In all centers of population along the railways there has grown up a generation of Japanese who know the homeland only by repute, and who, without exaggeration, may be said to be as much Manchurian as the Chinese themselves.



Wheel and Axle Yard at the Shakako Works



Carpenters' Shop at the Shakako Works



The open cut at Fushun Colliery showing two views of Kojoshi open-cut 300 feet Deep

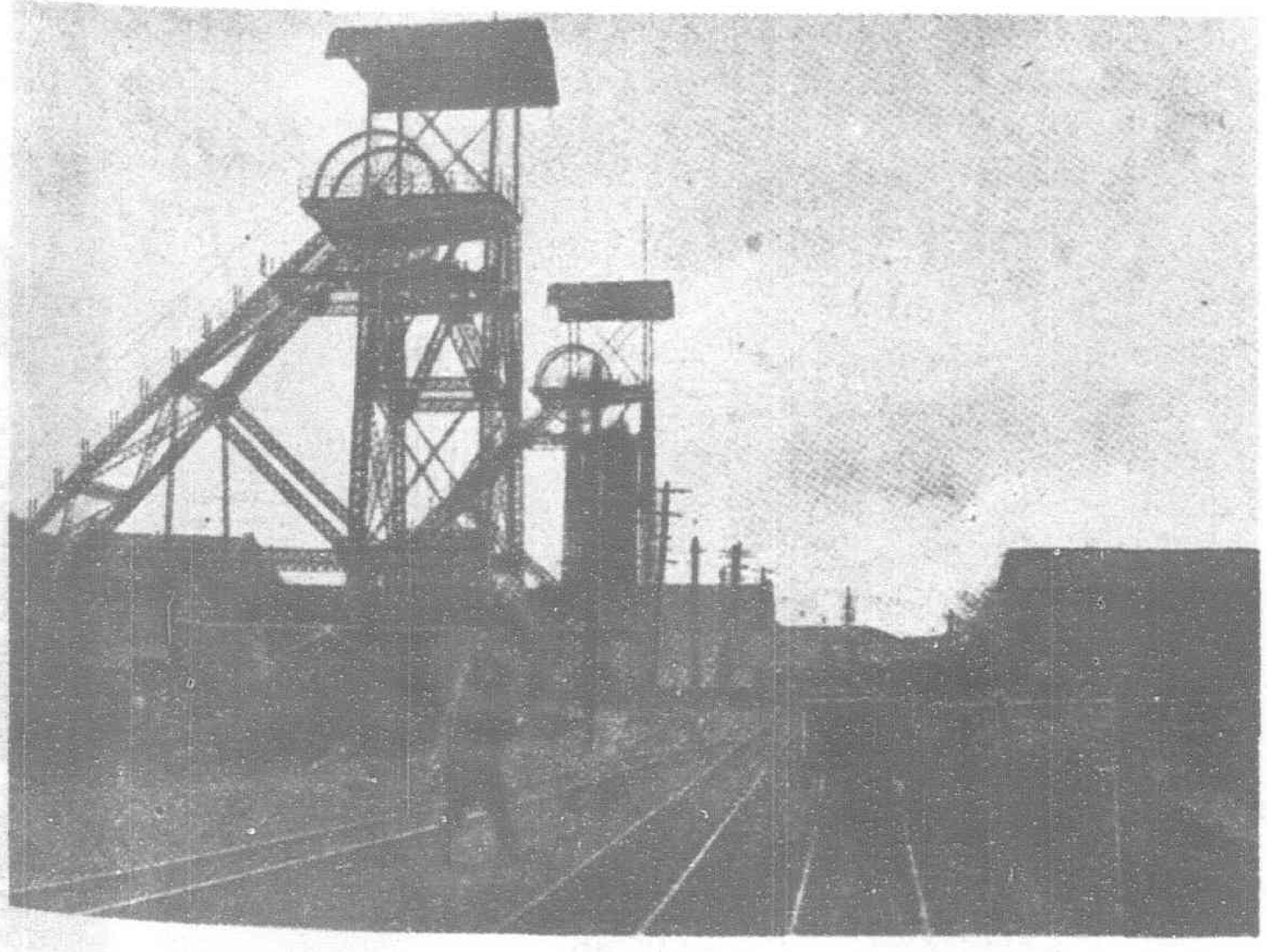
With the abolition of the railway zone as such, of all extraterritoriality, and the vexatious conditions attaching to this system; and now that the Japanese are free to settle wherever they can make a living, the new Manchurian must increase in stature and develop into a distinct type—still Japanese in his love for the Fatherland, but continental in outlook and physique, for he lives in altogether a finer climate and a better land. Everything depends upon the smooth progress of government and the maintenance of peace, and, given these conditions, from the group of Asiatic peoples now inhabiting Manchuria (Chinese, Japanese, and Korean, and to a lesser extent the Mongolian), must gradually evolve a new type. Their tastes and traditions are not widely divergent, and intermarriage must play its part in fusing the whole. Strongest of all unifying forces, ultimately, will be that of self-interest, stimulated immensely by the progress of ordered government, to which the mass of Chinese are complete strangers. The day may come when they will flourish in Manchuria, as they do in Hongkong, the Straits Settlements, and in all countries where they are permitted to live and trade freely.

The Port of Dairen

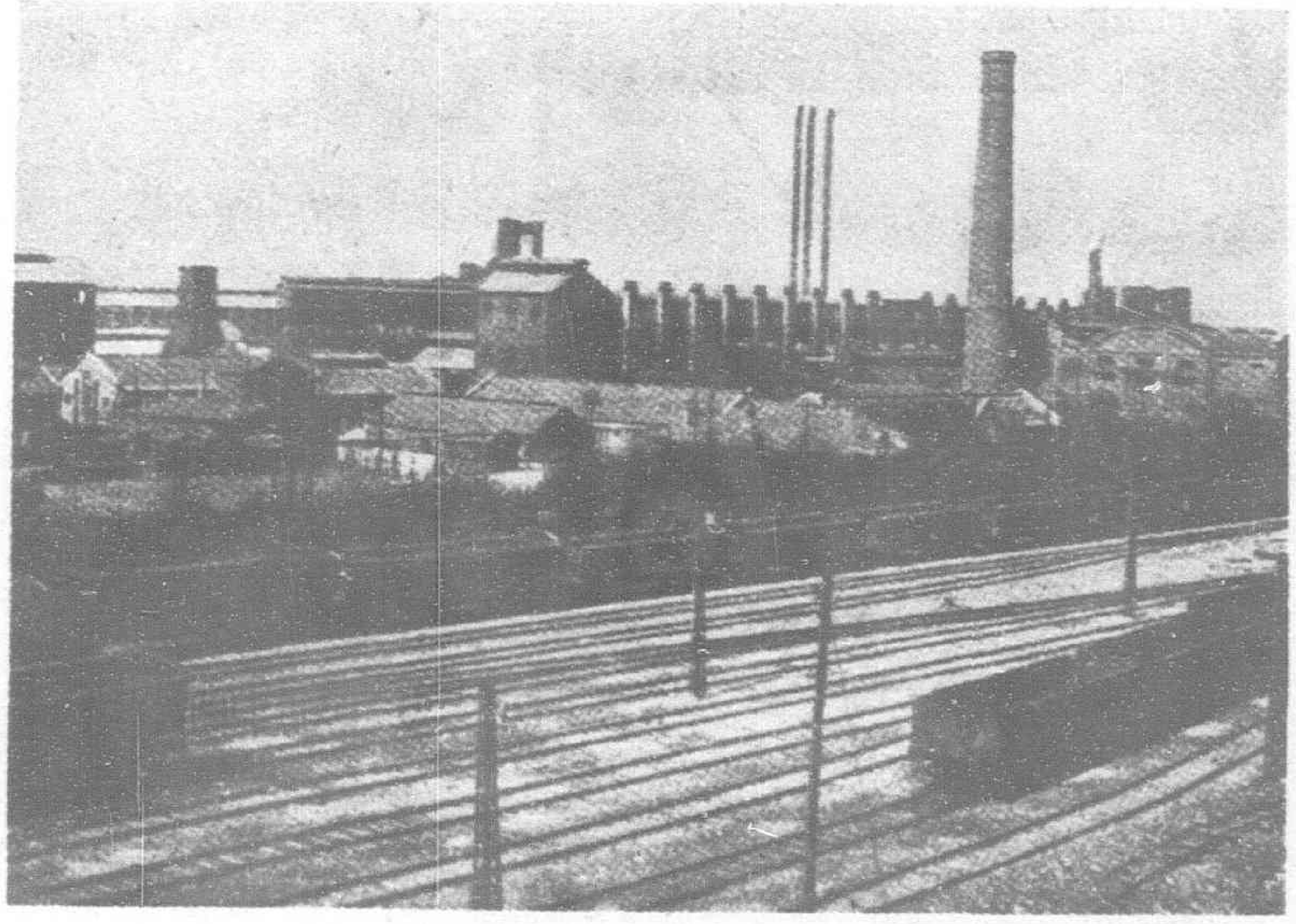
Dairen to-day has all the facilities of a first class port, and though no longer associated with the Chinese Maritime Customs, is second only to Shanghai in the amount of customs revenue raised, a due proportion of which is reserved for the service of the Chinese National Debt, and remitted to Nanking. The principal engineering establishment of the port are the railway shops of the South Manchuria Railway Company, which now do much building and repairing work for other companies, mainly Chinese. In the past decade the most important addition to the equipment of the port is the great coaling pier at Kanseishi, a few miles across the harbor, where Fushun coal, after being transported by rail for 200 miles, is tipped into ships' holds for export to Japan, China ports and further south.

In addition to the railway, there are two excellent motor roads connecting Dairen and Port Arthur, both of which are considerably shorter than the route by rail, 31 miles. The old road, asphalted, follows the southern coast line, providing a rapid means of communication, linking up numerous pretty bays and inlets that are now popular residential areas, while one but recently opened passes along the northern coast through a rich agricultural and orchard country, and through prosperous Chinese villages, in one of which Nogi met Stoessel after the surrender of the forts at Port Arthur. This road more closely follows the railway, and as he travels through the beautiful country, made glorious by the incomparable kaoliang, ready for the harvester, the motorist reflects that in no other part of Manchuria may he safely leave the town so far behind. Here he is in a bandit-free area under the administration of Japan.

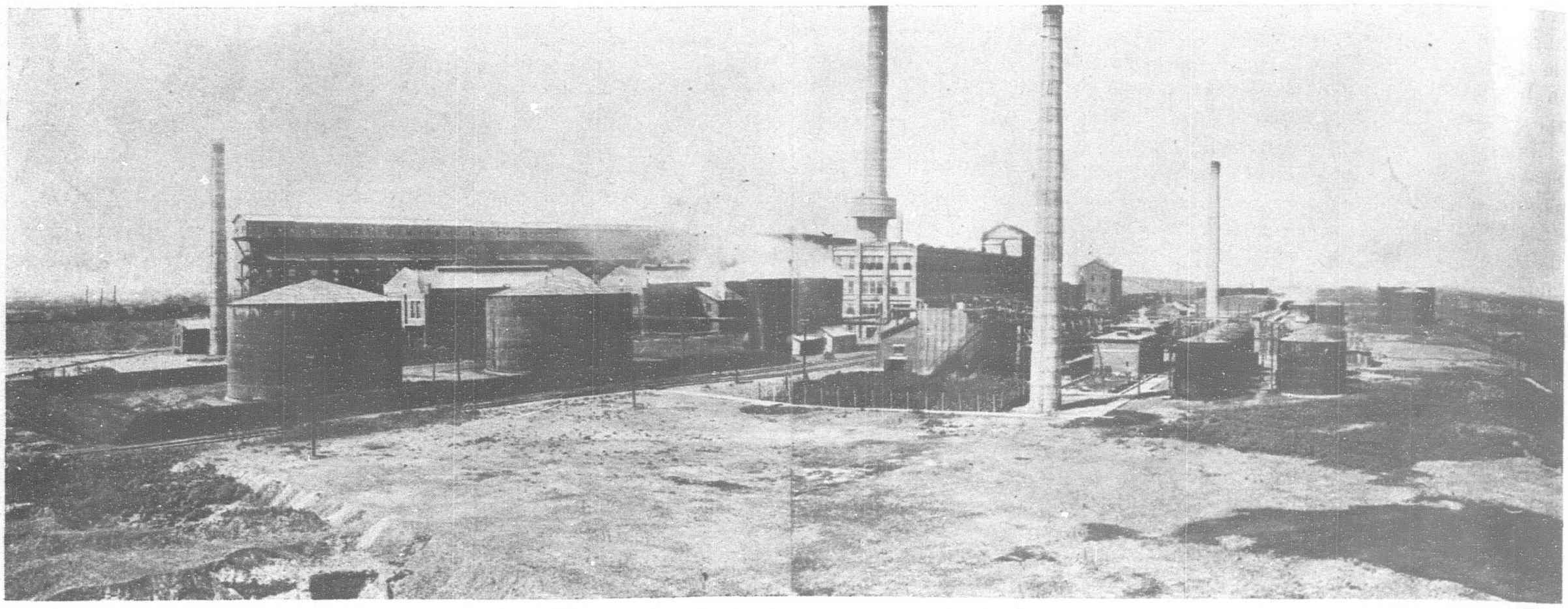
In Dairen, there has been a steady extension westwards of residential areas for Japanese, rows of strongly built houses reminding one of Lancashire. The severe winter climate makes substantial building absolutely necessary, but these houses of solid brick and double windows have no likeness to an English or Russian house inside, for the interior is Japanese. The floors are of matting, and all the usual Japanese interior features are retained, the domestic life of the homeland being thus to this extent preserved. And the Japanese worker returning home at the end of the day will discard his foreign clothes and don the comfortable kimono, after the daily hot bath, also an institution which few Japanese can live without. In the old Russian town is the original residential section of Dairen, a quarter of well-laid-out streets, with what appear to be still the most substantial houses in the port. These, thirty years ago, housed the numerous employees of the Chinese Eastern Railway, and are now occupied by officials of the South Manchuria Railway and members of the international community, not excluding rich Chinese, who find a safer haven here than in Shanghai. Kidnapping is unknown in Dairen, but it is common in Shanghai, where the police are helpless, the



Pithead Equipment at Oyama Shaft



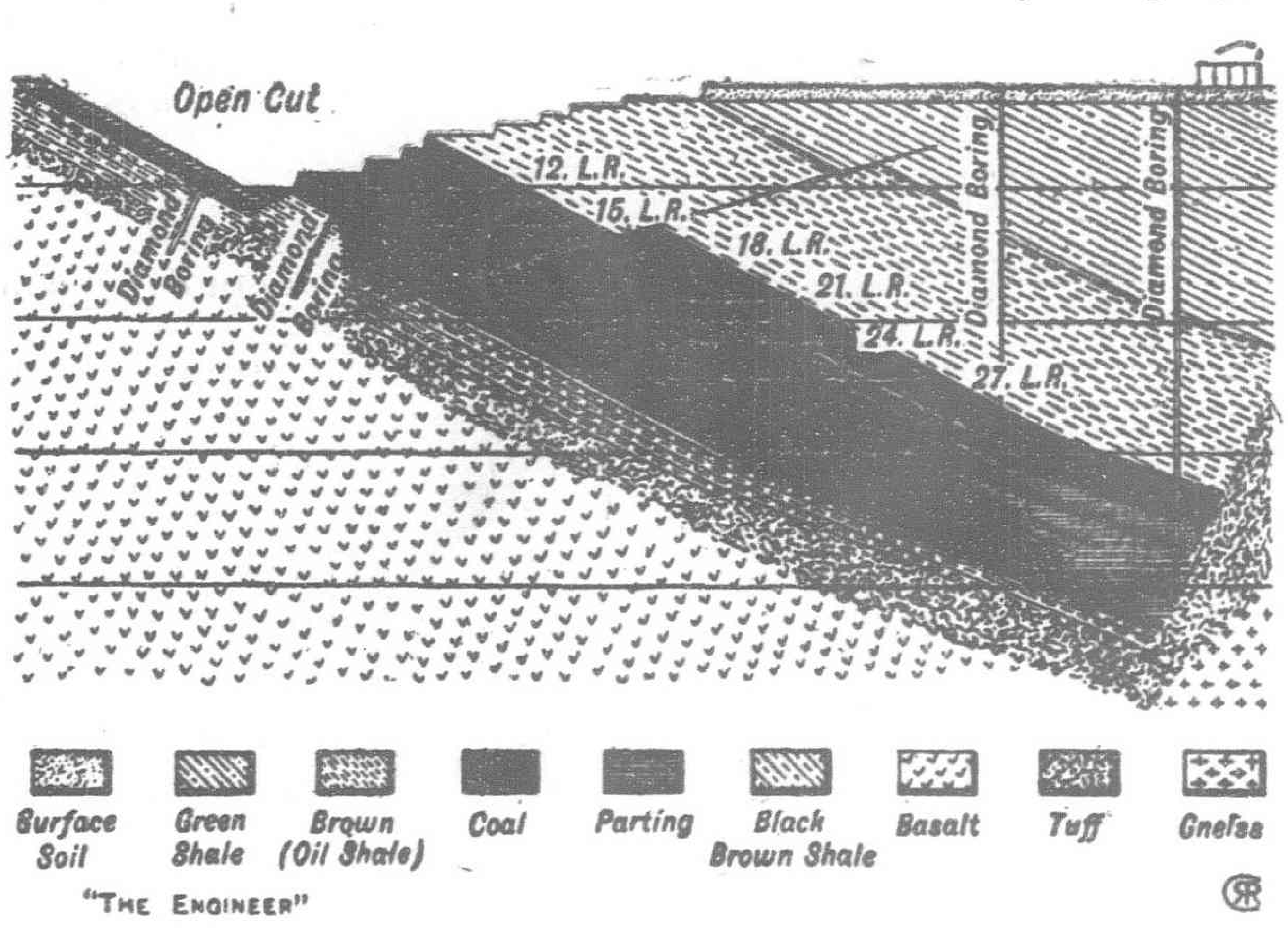
Mond Gas Plant at Fushun



View of the Shale Oil Factory at Fushun

victims' families not daring to report until the bandits' demands are satisfied.

Little but "Russian Town" remains in Dairen that is Russian in origin. The streets of the port as first laid out radiated from "circles" or circuses, and the Central Circle remains the center of Dairen, but when they assumed control, the Japanese adopted the block system, and so the town has expanded on something like the American plan. The population to-day is approaching 300,000, and, as in the case of all towns in the railway zone, Dairen is the creation of the South Manchuria Railway Company, which has provided waterworks and sewage; tram, and other systems of communication; hospitals, and parks, and built and equipped fine schools of all grades, in addition to maintaining the railway and the harbor, which are the two sources of prosperity of the inhabitants.

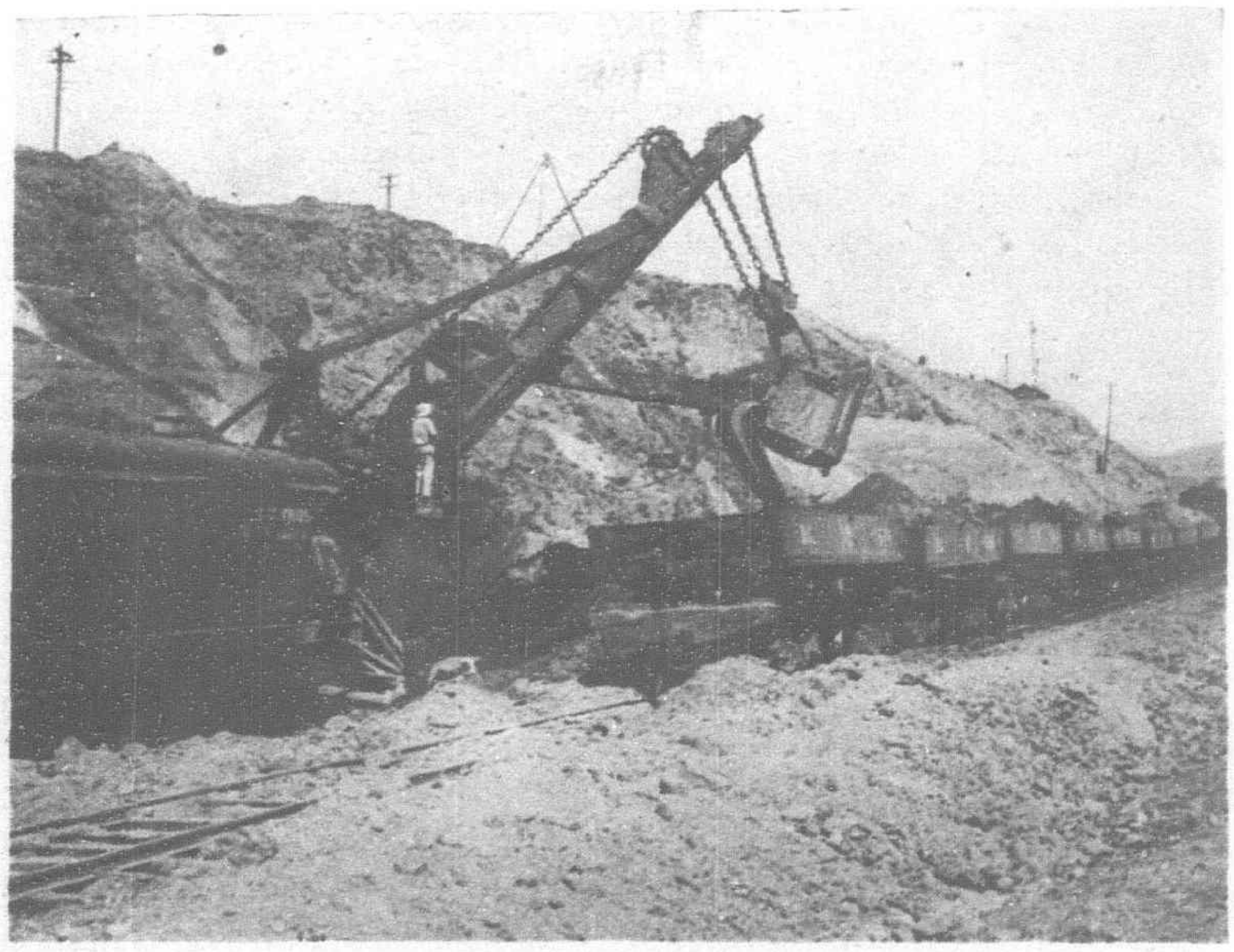


Geological Formation at Fushun

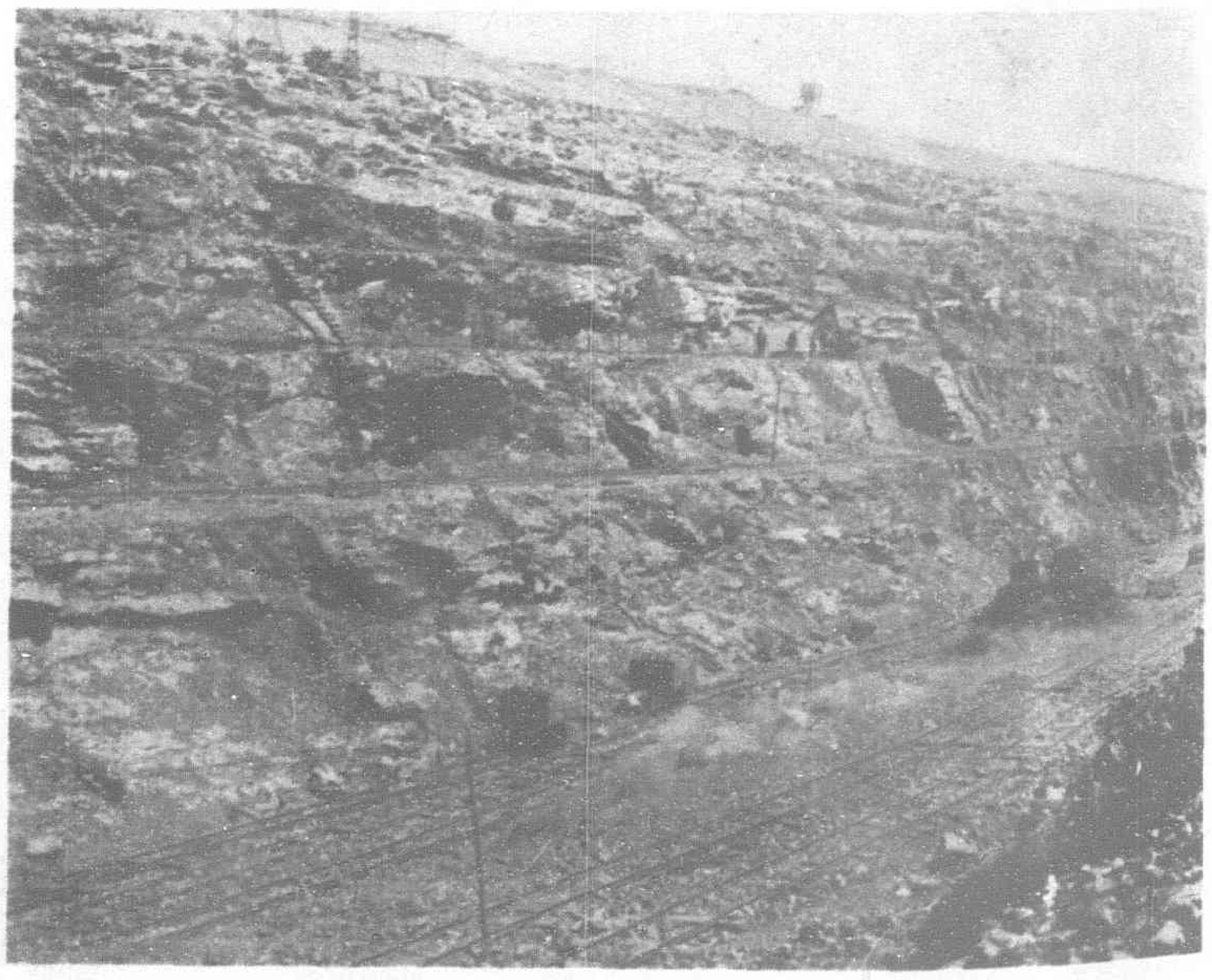
The Railway Shops at Shakako

Everything in Dairen begins in the year 1907, the year following the promulgation of the Imperial Ordinance establishing the South Manchuria Railway Company, a semi-official concern, the shares of which may be legally owned only by Japanese and Chinese. The president and vice-president are appointed with the approval of the Emperor, and the former is invariably a statesman, the last to occupy the presidential office being at the time of writing, autumn, 1932, the Foreign Minister of the Government of Japan, Count Uchida. The capital of the company, originally Y.200,000,000, is to-day Y.440,000,000, and its investments amount to nearly Y.800,000,000.

At the beginning the railway shops were temporarily established near the Dairen terminus, but there being no room so near the



Extracting Oil Shale



Oil Shale on Hillside, Coal at Bottom

center of the city for expansion, a large area of land was secured at Shakako, in the western part of Dairen, near the Shakako Station on the main line of the S.M.R. Plans for the new shops were made in July, 1907, and the works completed in August, 1911. During these years there were repair shops at Kungchuling, south of Changchun, Liaoyang, and at Antung, but with the completion of the Shakako works these were gradually closed down—that at Liaoyang as late as 1930—owing to the general depression prevailing.

Wherever the Japanese go, they will take with them not only the indispensable hot bath, but they will plant trees, and one finds trees in the most unlikely places. These are doubtless good points in the national character, but none the less one does not expect to run into a cherry tree while leaving a foundry and crossing a railway which runs into a sort of blast-furnace atmosphere. There stood the cherry tree in between, to flower in the spring, when every Japanese would be inspired to poetry at the sight. I remarked to my guide that that sort of thing did not happen in Lancashire, where everything was black and grim, as it should be—and he smiled.

The Shakako shops—are now the only manufacturing and repair works of the South Manchuria Railway Company, but they are very extensive and complete. They manufacture and repair rolling stock, machinery and tools, all kinds of railway equipment, and of late years have built to the order of Chinese railway companies.

The total area occupied by the shops and the quarters attached is 1,017,699 square meters, and a floor space of 69,824 square meters is provided in eighty-one buildings, brick, steel-framed, and wooden. All shops are equipped with heating systems, absolutely necessary in the prevailing climatic conditions, and all woodworking buildings with automatic fire sprinklers.

The amount of capital invested in the works is to date :—

	Yen.
Buildings	2,604,716
Rolling stock	81,556
Machinery	2,054,764
Construction	1,060,258
Rails	567,318
	6,368,612

and their capacity for manufacture and repair in one year is as follows :—

Locomotives	Manufactured, 30 ;	repair, 300
Passenger cars	Manufactured, 45 ;	repair, 420
Goods wagons ..	Manufactured, 650 ;	repair, 3,600

Rolling stock repairs—time averages :

Locomotives	6.0 days
Passenger cars	6.5 ,,
Goods wagons	1.7 ,,

(On the Government Railways of Japan (narrow gauge) the average time for locomotive repairs is five days.)

In connection with the shortening of repair days for rolling stock, the Shakako works claim a record for locomotives, in comparison with the works of Crewe, and of America, or Japan. The desire to emulate and excel the West in the creations of the West is the strongest motive force in modern Japan, and one wonders what will happen when the Chinese are seized with the same sort of ambition.

In normal times production was valued at about Y.10,000,000 per annum, but since the advent of the depression there has been some decrease, and production for the year ending March, 1931, was as follows :—

	Yen.
Rolling stock ; value of new construction and repairs	3,930,000
Miscellaneous work	3,690,000
Total	7,620,000
NEW CONSTRUCTION :	
Motor-cars	16
Passenger cars	5
Goods wagons	91
REPAIRS :	
Locomotives	200
Passenger cars	285
Goods wagons	2,137

Personnel

The *personnel* of the works comprises the following ;

Office staff		*Workmen*	
Japanese	Manchurian	Japanese	Manchurian
450	56	719	700

Workers temporarily employed not included.

A Safety Committee is active in the investigation and improvement of all means for the prevention of accidents and injury to health, and through the activities of this Committee the injury percentage is gradually decreasing. In this connection, there are "propaganda weeks" and other means to arouse workers' interest in their own welfare. These take place three times yearly, when emphasis is laid on means for the prevention of accident and injury, and diligence and efficiency inculcated, together with care of machines and conservation of materials. The latter is especially emphasized during "Saving Week," when there are lectures on the saving of power and shop materials.

Hours and Pay.—The hours for workmen are from 7 a.m. to 5 p.m., and for the office staff from 8 to 4. The wage system used for workmen and temporary employees consists of the Rowan system, and time work.

Training School.—An apprentices' training school provides courses covering four years. There are under training at present 274 boys, Japanese and Manchurian.

Design and Research.—Monthly circulars concerning design and improvements suggested by the employees are published, and the number of such designs and improvements adopted during the past year, 1931, was seventeen. These researches in the main were concerned with the improvement of organization of the works, concentrated management of tools, time and motion study, tool boy and mail boy systems, standardizing of tools, welding, shortening of repair days for rolling stock, use of domestic products, regulation of time limit of products, arrangement of machines and tools, centrifugal casting, transportation, limit gauging (viz., templates and fixtures), and machining cutting allowance, especially for brasses.

The men, Japanese and Manchurian, at Shakako works, appear to get on well together. There are no labor troubles and no labor unions, and the labor politician has not yet made his appearance. The management is proud of the fact that the workers are nearly all old-timers, the great majority having been in the shops for at least thirteen years. Skilled workers to-day come only from the apprentices' school, and all connected with the extensive shops, from the superintendent down, live under pleasant conditions, their homes being in tree-lined avenues, while they and their families are within a few miles of beautiful seaside resorts, not to speak of the attractions of the city of which they are a part, though quite distinct and separate from it. The manager, summing up the advantages of work and life at Shakako, wisely observed : "It is a very important condition for our works," and the visitor is bound to agree.

The engineers of the South Manchurian Railway take justifiable pride in the new coaling wharf at Kanseishi, a point across the inner bay a mile north of Dairen Harbor. It was completed in 1930 at a cost exceeding a million pounds sterling.

The South Manchuria Railway Company maintains coaling stations at Newchwang, Riojun (Port Arthur), and Dairen, all being used for the export of Fushun and Yentai coal. The original mechanical loading equipment at Dairen, which is within the harbor proper, is modelled on that at Durban, and was erected according to the specifications of a German company. The materials and devices used at the Kanseishi plant are principally American.

Preliminary work for the new coaling station involved the dredging of the approaches to take steamers up to 10,000 tons, and the construction of a breakwater extending over 3,000-ft. Dredging was begun in September, 1926. This work, together with breakwater construction, the erection of a steel pier 550 m. long, an extensive storage yard, two transporter bridges, and all necessary mechanical devices, was completed in July, 1930. The actual cost of the whole work was Y.12,042,732.

Kanseishi has a loading capacity of 12,500 tons per day, and four vessels of from 5,000 to 10,000 tons can be berthed simultaneously. While at present it is not working at full pressure, the coal trains from the mines at Fushun, 250 miles to the north-east, form the great bulk of the traffic of the South Manchuria Railway, with Japan, the China Coast ports, and points further south the overseas markets for Fushun coal.

The Coaling Wharf at Kanseishi

In all the great industrial undertakings of Japan in Manchuria, provision must be made, not only for the effective execution of the work itself, but for the care and comfort of the Japanese workers who, throughout Manchuria, North and South, live lonely lives. This may appear remarkable when it is considered how closely akin Japanese and Chinese are in so many respects, but there is no intermingling of the two, except on formal occasions, when the official classes come together. And recent events have widened the natural breach. This observation applies with still greater force to the workers of the two nations; there is no intimacy of any sort, and there is every necessity for social institutions such as the Club at Kanseishi, where wholesome recreation may be obtained by seamen while their vessels are coaling. This club, of course, is used by men of all nationalities, but Japanese are in the great majority.

A fine asphalted motor road connects the coaling station with Dairen, circling the bay, and once outside the limits of Kanseishi, one is so obviously in China, though in Japanese territory, that the sudden transition is startling. The Chinese life and character dominate the scene. The ubiquitous carter and coolie, ever active, ever moving, the teams of whole families of animals, yoked abreast and in tandem, horses, mules, donkeys, with their foals trotting alongside, present pictures of liveliness and activity that are exhilarating. Their importance in the scheme of things has been remembered by the road-builder, and only half of the road width is asphalted.

From the top of the Dispatcher Tower, a view of the Kanseishi plant is obtained. The outside platform of the tower is 72-ft. above ground level, and the only means of ascent is a lift. All the movements of loading, and the coming and going of wagon trains, laden and empty, are clearly observable, the work being done with an ease, precision, and regularity that must become monotonous to the operators above and below—so thoroughly typical of the mechanical age. In the tower, three men sit so many hours a day, pressing buttons and registering records, and below, trainloads of coal are poured into ships' holds with no more human effort than is entailed by the pulling of a lever. What a contrast, this silent work, to the noisy activity and unceasing movement, accompanied by rhythmic sing-song, that was the feature of the old coaling days at Moji, when men and women coal-passers formed an " endless chain" between barge and bunker, and coaled a ship by means of baskets holding a few pounds at a time, passing rapidly from hand to hand!

Is the mechanical world over-reaching itself with its deadly efficiency? The millions of China must be fed. At Kanseishi, work is done by a hundred men which in former days would have given employment and rice to thousands. Whatever may be said in defence of labor-saving machinery, at the present time of universal slump in commerce and industry it is but an added misery. Such devices are for prosperous times only, when there is work enough and for all.

Kanseishi Capacity and Coal Exports

The latest issue of *The Goods Year Book of the Port of Dairen*, covering the trade of Dairen for the year 1931, gives the following as the principal equipment and capacity of the Kanseishi Pier, with the total exports of coal from the port for the past six years:—

One car dumper, maximum capacity 1,800 tons per hour.

Four loaders, each of maximum capacity of 600 tons per hour.

Six pier wagons, capacity of each 65 tons.

Two bridge transporters, each with coaling capacity of 280 tons per hour.

Four electric locomotives, each with tractive power of forty wagons holding 30 tons.

Coal yard, maximum storage capacity 300,000 tons, area 130,000 square meters.

Figures are given in the year book of the exports of Fushun coal during the past six years compared with the total exports of the port, which are reproduced below:

1926 .. 2,140,716 tons, compared with total exports 4.15%
1927 .. 2,613,544 tons, compared with total exports 4.46%
1928 .. 2,701,474 tons, compared with total exports 4.32%
1929 .. 2,774,664 tons, compared with total exports 4.00%
1930 .. 2,186,858 tons, compared with total exports 4.16%
1931 .. 2,481,671 tons, compared with total exports 4.18%

The present loading capacity of the pier is 3,800,000 tons per annum; this is capable of expansion to five millions.

Within a mile of the pier is an extensive deposit of limestone, which is being quarried for local use and for export.

The Dispatching System

The superintendent of the Kanseishi coal pier, Mr. S. Hamano, explained the mechanical loading system to me in the following terms:—

In the room of the dispatching tower three men are at work. The first is in charge of planning; the second dispatches his orders by using a series of push-buttons; the third controls weighing.

Planning.—Stowage plans are delivered by the stowage master; the number of wagons, and the quantity and class of coal in the gravity yard are reported to him by the yard master. Both are under the control of the superintendent.

In the tower, the first man plans the working of the whole plant as far as shipping is concerned, and transmits dispatch orders to the second.

Dispatching.—In the dispatching process, there are several operations:

(1) The required number of wagons is indicated to the yard master. In the gravity yard are six tracks and on the bridge spanning the tracks are six signal lights, one controlling each track. A light signals the wagons on the line indicated to start to the cardumper, and as long as this light is on, wagons are continually sent forward.

This order is given by turning a button on the dispatch board. The numbers on these buttons correspond to the numbers of tracks in the yard. The dispatcher also turns the needle of the car-number indicator B to the point corresponding to the required number of wagons.

After the wagons have started moving, and as they pass under the signal bridge, the needles turn back one after another until all the required cars on the specified track are delivered; at the same time, the light on the signal bridge is extinguished automatically.

(2) To indicate way for loaded pier wagons: When the pier wagons receive coal from the cardumper, the dispatcher turns on the " loaded " signal light. There are four lamps corresponding to four loaders. The pier wagon operator then knows the loader he is to discharge.

(3) To indicate way for empties: When empty wagons return along the central track on the pier, the dispatcher indicates by signal light what the operators must next do, *i.e.*, return to cardumper, or run up to storage yard for more coal; go to gravity yard to haul loaded wagons direct to pier without using cardumper (which saves coal breakage by dumper), or go to pier siding, to repair shop, and so on.

Each number from 1 to 6 has its special meaning, which is known to the pier operators.

Weighing.—The weigher has no relation to the dispatcher. He prints the weight of coal, which is communicated from the track scales to the dispatching room. Weights are printed on the respective wagon tickets.

The Track Scales.—There are two sets of scales. One weighs the coal discharged by the dumper; the other that from the storage yard. The wagons move at a speed not exceeding 10 kiloms. an hour, as indicated on the scales.

The weighing mechanism is a modification of the Blake-Denison type. The measured weight is transmitted by means of patented mechanical and electrical appliances to the dispatching room, where receiving sets are installed to indicate the respective weights automatically. Aggregate weights are also indicated.

These scales were designed and manufactured by the Moriya Scale Works, Tokyo. The scales have a weighing capacity of 90 tons.

An Improved Cardumper

The cardumper, together with the loaders and pier wagons, was supplied by the Alliance Machine Works, Alliance, Ohio, but has been improved by Japanese engineers. In the original type, the receiving hopper is always stationarily installed before the dumper, and coal breakage is enormous owing to the high drop. In the improved type, the hopper is attached at the top of the turning cradle, and during the turning of the cradle the coal is gradually discharged from the wagon, and slides into the hopper. At the extremity of turning, the hopper end goes into the pier wagon at about one-third of the height of the car-hopper, and at this instant, the hopper gate opens automatically and discharges, thus avoiding breakage to a great degree. This improved design has another merit. As the center of turning is also the center of the weights of the cradle, and wagon on one side, and hopper on the other side, the turning torque of the motor becomes very small, with a consequent great saving of current.

Fushun: A Great Mining Area

A few days after my visit to Fushun, the town was attacked by a large force of bandit-soldiery, when the garrison, and all Japanese who could bear arms, were called up for the defence. There was severe fighting at the pitheads, and one of the mine managers was among the killed. The incident demonstrated the strength and confidence of the bandit forces, for Fushun is now a mining town of nearly a hundred thousand population, and is well policed and protected by the military. The object of the attackers was to destroy the mine machinery, and so work as much damage as possible upon the Japanese; but in this they were effectively frustrated and retreated with heavy loss. Such losses, however, they can bear much better than the Japanese can stand the loss of a tenth of their number. The Chinese source of supply of man-power is unlimited; no sooner are a few hundreds put out of action than others fill the gap, and so the warfare will go on until the Japanese, with the full and vigorous co-operation of the new Government, completely destroy the power that instigates the bandit activities.

Between five and six hundred years ago, Korean emigrants used coal at Fushun, which was exposed on the surface, to fire pottery kilns, but they never made other use of it. On the eve of the Russo-Japanese War, the Russians were mining some 300 tons a day for their railways, but they never attempted to exploit the great deposits on a commercial scale. At one time, the Chinese authorities prohibited mining operations because of the proximity of the mines to the Imperial Mausoleum east of Mukden.

To-day, the Japanese mine some 20,000 tons of coal every twenty-four hours, which represents two-thirds of the capacity of the colliery equipment.

One of the richest fruits of the Russo-Japanese War was the title to the Fushun mines, and as soon as the Japanese secured possession, they set about the work of examination and exploitation with the thoroughness which we have come to associate with them in everything they do in Manchuria. The best brains and the best machinery, native and foreign, were engaged to investigate and analyze and open up, and to-day Fushun coal is exported by the millions of tons to markets abroad in competition with Japanese and Chinese coals.

A great change has taken place at Fushun since a visit I paid ten years ago. A whole town has been shifted in the interval. What is now called the Old Town was giving way at the foundations, it being built over the western deposit and near the underground mines. Promptly, surveyors and builders set to work upon the New Town, in an area where foundations would never be disturbed by operations beneath, and it is hardly necessary to say that the new is much better than the old.

The South Manchuria Railway Company, as in all towns in the railway zone and municipal extraterritorial areas, has imposing central offices, fronted by ornamental gardens, and on the opposite side of the well-paved street, along which runs a tramway, is a large general hospital, the company's property, for the free use of sick and injured. Such institutions are to be found throughout South Manchuria. They are an investment that well repays the company, with its 30,000 Japanese employees and some hundred of thousands of Chinese, workers and dependents, who are concerned directly or indirectly with the railway and the numerous subsidiary enterprises. In such conditions, whatever, the political faults of Japan in Manchuria, it can be stated that the Chinese are much better off under the foreign *régime* than they are under the rule of their own people. Poor the pay may be, and long the hours of labor, as a rule, but these conditions are more than offset by the care taken by the company of workers and their families.

The Open Cut

The feature of Fushun is the now famous Open Cut which is some 50-ft. deeper, much broader, and more regularly terraced than on my previous visit, when it was estimated to be some 250-ft. deep. The coolies at work in the depths look like midgets scooping out a great hole.

The Fushun deposit is classified as of the tertiary period. It is claimed that there is no deposit in the world where so large a quantity of coal is contained in so small an area. This, roughly, is 23 square miles. The length is 10 miles from east to west, and 2¼ miles from north to south. The depth averages 130-ft., and the greatest thickness is at the west end, 430-ft., while the slope is 30 deg. The mine area is estimated to have contained 1,000 million tons of coal, of which quantity 100 million tons have been extracted in the past twenty-four years, there remaining an estimated quantity of 600 million tons still recoverable.

The coal is semi-bituminous. The eastern half of the deposit has caking properties, and this coal is used for the manufacture of town gas and coke. The western half is semi-caking, and is used for steam and heating purposes.

Analysis of the coal gives the following contents:—

Moisture	3.9	per cent.
Volatile matter	41.23	,, ,,
Fixed carbon	45.16	,, ,,
Ash	9.71	,, ,,
Nitrogen	1.63	,, ,,
Sulphur	0.66	,, ,,
Calorific value	6,800	calories

Capital Expenditure and Methods of Operation

The South Manchuria Railway Company, Ltd., has invested the sum of Y.123,000,000 (£10,230,000 at par) in the development of these mines, and in subsidiary industries.

The Open Cut is worked by a completely mechanized multiple-bench system. The underground mines are worked by a longwall slicing system in connection with hydraulic sand packing. The output per day aggregates 20,000 tons, half of which comes from the open pit. The record production year was 1929-30, when there were mined 7,300,000 English tons. Since that date, owing to the depression, there has been a steady decrease, and the political upheaval has further prejudiced export, particularly in the China market, where a heavy import duty has been applied to coal from Manchuria, as from an "unknown country," the rate to-day—autumn, 1932—being Y.3 per ton, where formerly it was only 25 sen. This is greatly to the advantage of the company's principal rival in China, the Kailan Mining Administration.

The coal sold in the fiscal year 1929-30, which amounted to 7,991,871 tons (which exceeded the quantity actually produced in that year), was disposed of as follows:—

		Tons.
Exported to:	Japan	1,849,000
	Korea	404,000
	Formosa	10,000
	North China	166,000
	South China	1,101,000
	South Seas *	223,000
Bunker coal:		705,000
Consumed in Manchuria:		
	By S.M.R. Railway	1,402,244
	By railway employees	65,141
	Other consumers	2,024,811

In the year under review, the sale of coal yielded Y.81,379,322; of other minerals, Y.2,985,343. The total receipts were Y.84,364,655, and the expenditure Y.72,089,548, the profit on the year's working being Y.12,275,116.

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*South Seas (Nanyo Yumi) are not the groups south of the Equator, but the Philippines, Dutch Indies, etc.

Mine Equipment and Capacity

The mines and their equipment capacity are as follow :—

		Tons daily.
Open pits :	Kojoshi	15,000
	Yangpaipu	2,500
Shaft mines :	Oyama Pit	3,000
	Togo	2,500
Slope mines :	Rokodai	3,500
	Ryuho	3,500
		30,000*

One of the several pamphlets issued in English by the mine management describes former and present methods followed in the working of the mines, the following being an excerpt :—

" As the Fushun coalfield is unique in its thickness, the question as to how to operate it provided a difficult subject for study when the Japanese took it over. The company, under whose management these mines were put in due course, having no experience in mining a thick coal seam and no knowledge as to the quality of coal beds or (what) upper layers there were, began with the pillar-and-stall system. The defect of the system was that a great deal of coal had to be left untouched at the bottom. To make the most of this rich natural resource, therefore, a wiser method—the sand-flushing system—was introduced.

" On the other hand, at the western end of the coalfield, where the top of the coal seam is exposed, or not so deep, the open-cut system was started in 1925. At present there are six collieries at Fushun, producing ever-increasing quantities of coal :

Kojoshi Colliery	Kojoshi and Southern Oyama pits
Rokodai	Rokodai and Mandatsuoku pits
Oyama	Main and Southern pits
Ryuho	Shinton, Ryuho, and Toren pits
Togo	Main and Southern pits
Yohakuho	Yohakuho and Higashigaoka pits

" (a) *Open Cut System.*—At the west end of the coal seam, where the thick top comes up near the surface, coal is stripped of the covering earth and oil shale by means of the open-cut system. This is a great advantage over the vertical and inclined shafts mining system. By this method such dangers as the explosion of gas in the pit and the collapse of the hanging wall can be avoided, and, what is still better, the coal deposit can be excavated in its entirety. Moreover, mining on the open-cut method is far easier than mining in a sunken pit. The result is an increase in efficiency and a decrease in expenses, as there is no need of mine posts. The amount of production can also be regulated more conveniently according to demand.

" At the Kojoshi Colliery, at the western end of the coalfield, the seam is unusually thick and the top comes near the surface. Here the open-cut method was introduced at one place in 1914, and at another in 1918. It was realized that by using this method on a larger scale a higher degree of efficiency could be obtained. The company, therefore, began to operate on this method on an extensive scale in 1919, extending it more and more until at present more than half the output of the Fushun mines is produced by the open cut.

" In operations, excavators are used to remove the covering earth. Then the upper layer is dynamited, and the pieces are gathered together by means of electric and steam shovels and immediately carried away by rail to the dumping place, or to the shale-oil plant, thus exposing the coal seam. The exposed surface is then shaped into terraces—see illustration. The seam, after being exploded by black powder, is mined by means of electric shovels or manual labor.

" In open-cut mining no skilled labor is needed, as in the case of shaft mining, and Chinese coolies are employed. They number as many as 15,000 per day, turning out an average of 10,000 tons of coal a day at Kojoshi Colliery alone. The open-cut method, which was originally adopted at Kojoshi alone, proved so efficient that it was adopted by pit after pit until, at present, Southern Oyama, Yohakuho, and Higashigaoka collieries are operating by this method on a large scale.

" (b) *Vertical and Inclined Shafts.*—The mines are also worked on an extensive scale by shafts or pits, and the coal is then brought to the surface. The method is adopted at four collieries—Oyama, Togo, Rokodai, and Ryuho. The sand-flushing system is now in operation. The shaft, after the coal has been taken out, is filled with earth and sand by means of water pressure. Under the old pillar-and-stall system it was impossible to get more than 20 per cent of the coal deposits. There was also the danger of spontaneous explosion. The new method eliminates this danger, and 70-80 per cent of the deposits can be obtained.

" Earth or sand used for filling is taken from the bed of the Hun River and from the weathered gneiss hills south of the coalfield. It is carried to the flushing ' pocket,' where water is added in the proportion of 100-200 per cent. The mixture is forced, by pressure, through iron pipes to the shaft ready to be packed. The water is pumped out to the surface of the earth when the fillings of sand and earth have settled. Since the establishment of the shale-oil plant, shale waste has also been used for packing."

Dressing Plants

With the extension of the open-cut operations, a dressing plant was established at Kojoshi in September, 1926, at a cost of Y.2,300,000, two years being required for construction. Capacity is 1,000 tons an hour. There is a central dressing plant, and some of the mines are equipped with washing machinery of the Baum type and the Marcus conveyor. After treatment, coal is marketed as lump, of a size over 40 mm. ; nut, 40-25 mm., and dust, under 25 mm.

By-product and Power Plants

Two power plants have a total capacity of 80,000 kw.—one being equipped with the Mond gas producer—see illustration—as well as the Lymn system and by-product recovery process, where low-grade coal is treated, yielding sulphate of ammonia and tar, and producing gas for use in the generation of electric power.

The second power plant has a pulverized coal burner on the Holbeck system, effecting perfect combustion, coal being pulverized to 1/100-in. and used for the generation of electric power.

The power generated by these two plants is used locally for power purposes and lighting, and the surplus is transmitted to towns along the S.M.R., including Mukden. Transmitting capacity is 10,000 kw.

A sulphuric acid plant in which have been installed the Bunkey and Weyer systems, produces 100 tons of chamber acid daily, which is used in the manufacture of sulphate of ammonia, and supplies demand in Manchuria. This plant is being equipped to produce concentrated sulphuric acid.

Thirty ovens of the by-product recovery coke plant, with a coal-washing equipment, which were originally set up to produce 100 tons of coke daily, are now being used for low-temperature distillation of coal, and coalite low-temperature tar, volatile oil, etc., are produced, and the surplus gas supplied as domestic fuel. A tar-distillating furnace, capacity 60 tons daily, produces creosote, pitch, etc. Briquettes are also made in an adjoining plant.

Some 300 kilos. of potassium chlorate are produced daily as material for explosives used in the Open Cut and to meet general demand. Hydrogen to the amount of 52,000 liters daily is produced for the rescue service and for oxyhydrogenl ights.

The Oil Shale Plant

The great oil-shale plant was erected at a cost of a million sterling. The use and disposal of huge reserves of shale, estimated at over 5,000 million tons, had engaged attention for over twenty years, until, in 1928, it was finally decided to make the best use of the deposits, though this course called for a heavy initial outlay. The value of oil to be recovered was not the chief consideration, but this, in a combination with the use of the waste for packing, presented itself as a profitable undertaking, and so it has proved.

The work of construction was completed in November, 1929, the capacity of the plant being 70,000 tons of fuel oil and by-products, ammonium sulphate, crude paraffin, and coke. In the first year of working—1930-31—there were produced 28,578 tons of heavy oil, 10,606 tons of crude paraffin, 13,332 tons of ammonium sulphate, and 2,685 tons of coke. The year's working, contrary to all expectations, yielded a small profit.

There is wide divergence of opinion as to the oil content of the shale, estimates ranging from 2.12 to 10 per cent. Systematic investigation and trials made by diamond borings, sunk through the entire seam, are now held to prove that oil in shale near the surface amounts to 10 per cent, and in shale just over the coal seam less than 5 per cent. The average is placed at 6 per cent, and the final result of many analyses is:

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*Total equipment capacity daily output.

Carbon	12.22 per cent
Hydrogen	1.95 ,, ,,
Nitrogen	0.52 ,, ,,
Sulphur	0.15 ,, ,,
Oxygen	11.06 ,, ,,
Ash	74.10 ,, ,,
Heat value	1,420 calories

Stimulated by these conclusions, a thorough investigation was carried out with a view to the fullest utilization, and samples of the shale were forwarded to Scotland and other countries for expert analyses. The reports obtained are held to have established beyond question the industrial merits of the shale.

Fushun engineers (Messrs. Okamura and Hasegawa) devised and perfected an internal heating system, which, locally, is considered unique. It has been patented by the South Manchuria Railway Company, whose view is that it opens a new field for the oil-shale industry in Manchuria. As a preliminary test, a 10 ton furnace was erected, and results are reported to be satisfactory.

The company, having put this system on a working basis, next prepared plans for the distillation plant, consisting of eighty distilling cylinders each with daily capacity of 50 tons of shale. A crude oil refinery is to be attached. The raw material at present handled amounts to 1,360,000 tons per year, and production is:

	Tons.
Crude oil	69,700
Heavy or fuel oil	53,000
Sulphate of ammonia	18,200
Coke	5,000
Crude paraffin	13,000
Refined white paraffin	7,000

The crude oil is refined in Japan.

Labor at the Mines

The labor union is as yet unknown among the Chinese. The world knows they can unite with destructive effect when the incentive is present, as the boycotts against foreign interests during the past quarter-century amply prove. However, the paternal system prevailing in Manchuria would hardly admit of a union of the men aiming to better their conditions, much less of the labor agitator, and labor politics are, therefore, non-existent. So far, the South Manchuria Railway Company has been fortunate in its experience as the largest employer of labor in Manchuria.

Of the 30,000 Chinese employed at the mines, 70 per cent are from Shantung, and the remainder are Manchuria born. Over two thousand Japanese are employed as mechanics and overseers. The average daily wage of Chinese underground workers is 80 sen (1s. 7d. at par) per eight-hour shift. With the exception of food, workers receive all prime necessities free, viz., they live rent-free, and receive light, fuel, and bath free of charge. Medical and surgical treatment for all in the employ of the company is free, and workers receive full pay while recuperating from injury.

Facilities for recreation are provided, with periodical concerts, and cinema and theatrical entertainments. At a conspicuous place in the colliery quarter is a shrine dedicated to Lao Chun, a Chinese deity.

There is a craft-training school, where those incapacitated from further manual labor are taught to make shoes, hempen ropes, and brooms, the product being purchased by the company.

The Japanese workers occupy the foreman, clerical, and managerial positions, their pay averaging Y.2.50 (5s. at par) per day. Retirement allowance are given to both Japanese and Chinese workers, from coolie to superintendent—a practice common among all workers in Japan.

The Fushun undertakings are under the general superintendence of Vice-Admiral Dr. Takuo Godo (Ret.), former Director of the Naval Arsenal at Kure. The chief engineer is Mr. T. Kubo.

Admiral Godo is also Superintendent of the Anshan Ironworks and Mines, and President of the newly formed Showa Steel Works. The steel works are still in the formative stage, and the site has not yet been decided. This is a great national undertaking which has received the approval of the Government and the Diet, and only financial stringency has prevented its earlier establishment.

The population of Fushun has expanded considerably during the past decade, and is now estimated at something in excess of the following figures:—Japanese, 18,000; Chinese, 70,000; Koreans, 3,000. There are a few Russians, and one at least who works in the mines, receiving the same pay as the Chinese miner.

The small Occidental population is represented by the priests and nuns of the Roman Catholic Mission. In September, the diocese of Mukden was divided into two, and Fushun is the center of a new diocese, which includes large areas of Mukden and Kirin provinces. While the old diocese remains in charge of French priests, the new has been taken over by American priests from the Jesuit Seminary at Ossining, N.Y.

A minor industry of Fushun is the working of amber recovered from the coal. This is in the hands of Chinese craftsmen.

High Pressure Turbine Plant for Russia

One of the most interesting stations built in connection with the comprehensive electrification schemes of the U.S.S.R. is that of the Thermo Technical Institute of Moscow. In this station very high thermal efficiency is expected from the installation of high pressure Loeffler boilers supplying one or more primary turbines which in turn will exhaust to the existing steam system at 384 lb. sq. in. abs., the scheme to some extent following that adopted in the Billingham Plant of the Imperial Chemical Industries but employing considerably high steam conditions.

The first primary turbine unit which is being built in this Country by Metropolitan-Vickers Electrical Co. of Manchester is designed to operate normally with steam at a pressure of 1,778 lb. sq. in. abs., superheated to 878 deg. F., and to exhaust at a pressure of 384 lb. sq. in. abs., actually it is designed to withstand continuously a temperature of 932 deg. F. and for short periods a steam temperature of 968 deg. F. The unit will be of 24,000 kw. maximum continuous rating, running at 3,000 r.p.m. and will be coupled to an alternator which is being built in Russia.

In order to view this unit in its true perspective it should be appreciated that it deals with the same steam quantity as that of a condensing unit of about 84,000 kw. output built for and operating under similar high initial conditions, its actual steam consumption being of the order of 300 tons per hour. It will be, in fact, the largest unit yet built for what might be termed extra high pressures, i.e. pressures over say 1,000 lb. sq. in. g.

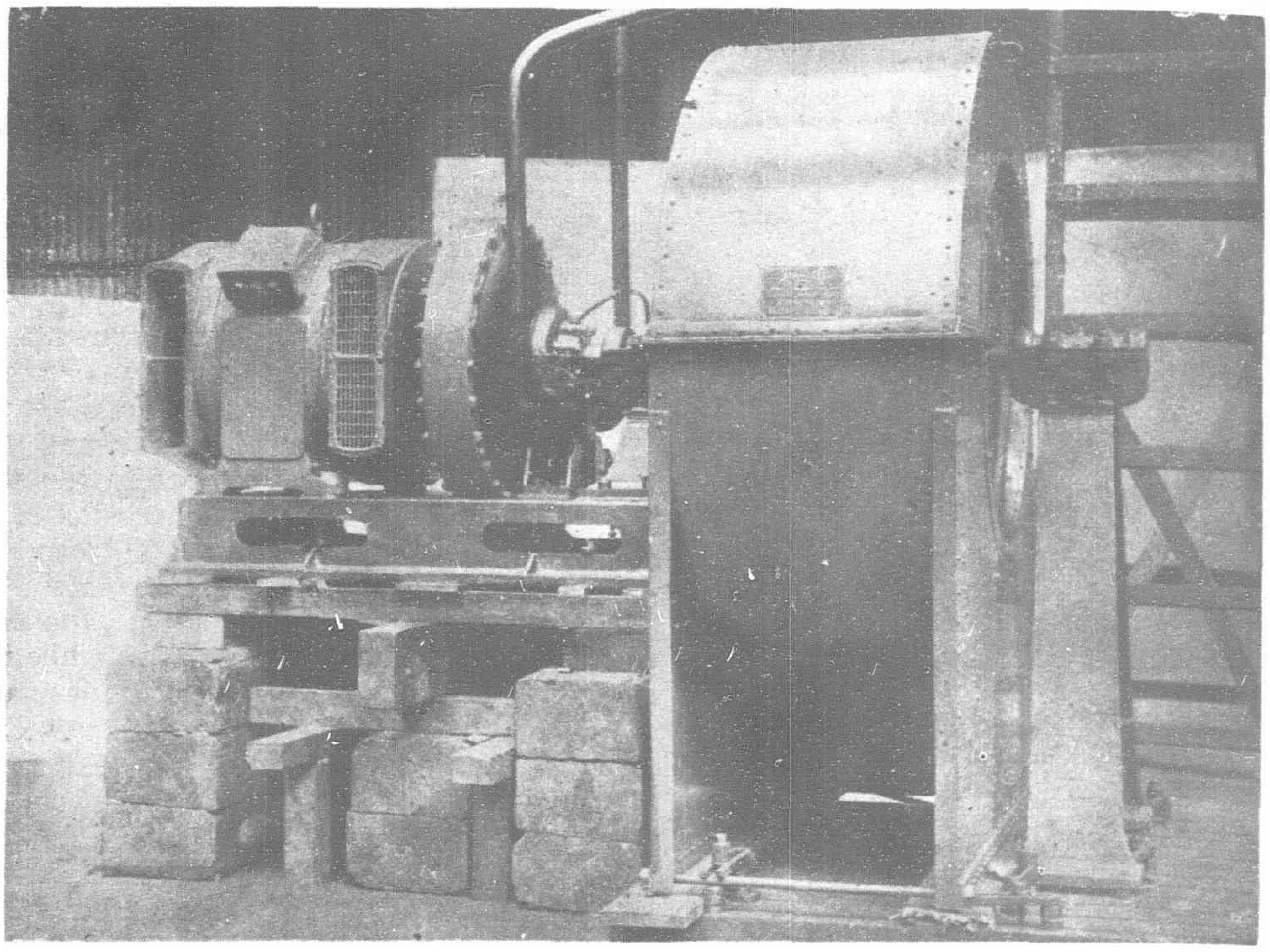
The actual design of the turbine cylinder follows to some extent that adopted for the three primary turbines built by Metropolitan-Vickers for the Billingham Station. It will be recalled that these units which are each of 12,500 kw. capacity, running at 2,400 r.p.m. were designed for initial conditions of 630 lb. sq. in. abs. superheated to 833 deg. F. exhausting at 275 sq. in. g. and have now been in commercial service for over three years.

Speed governing is adopted but means are incorporated in the governing system for automatically maintaining the turbine exhaust pressure within certain limits by the transfer of load to or from condensing units in the station. Two steam chests are provided one at either side of the cylinder as in the case of the Billingham plant, each chest containing four admission valves. There are thus eight steam connections, each of relatively small diameter, to the cylinder itself, which facilitates the provision of the necessary degree of flexibility for expansion.

In the design of the turbine and in the choice of materials to meet the high steam conditions full advantage has been taken by the Metropolitan-Vickers Co. of the most recent researches carried out in their Research laboratories into creep of metals at elevated temperatures and associated problems. In many respects this turbine represents a considerable advance in the technique of power generation and its operating results will be awaited with great interest by engineers throughout the world.

Extensions at Hongkong Electricity Station

A Notable Installation of Fans and Infinitely Variable Speed Hydraulic Couplings



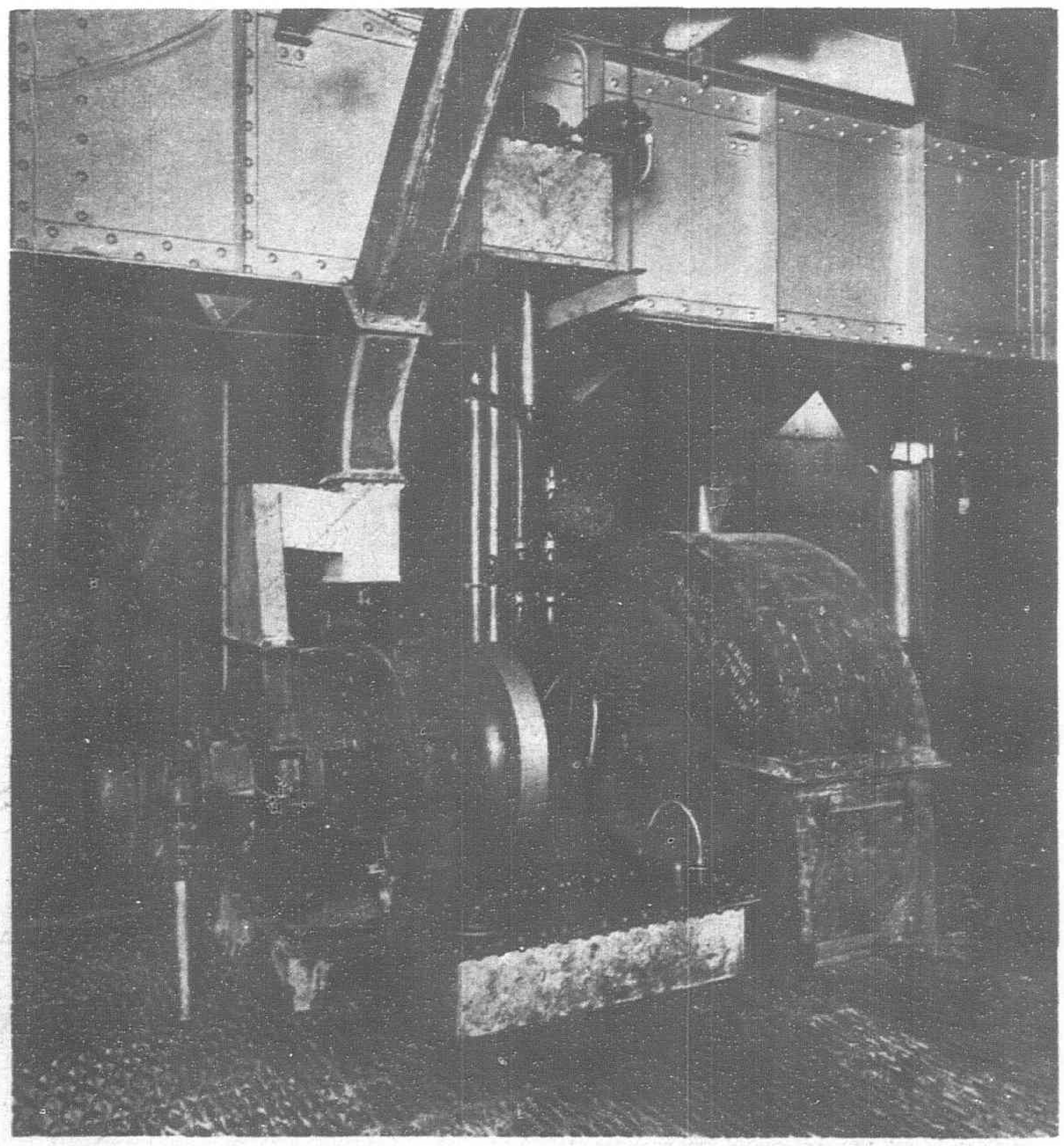
"Sirocco" Forced Draught Fan with "Vulcan-Sinclair" Infinitely Variable Speed Coupling and A.-C. Electric Motor for Hongkong on Test Bed in the Sirocco Works of Messrs. Davidson & Co., Ltd., Belfast

Considerable interest attaches to recent extensions at the Hongkong power station (Hongkong Electric Light and Power Co., Ltd.). This has included two water tube boilers of 75,000 lbs. normal evaporation per hour and 100,000 lbs. overload, while also a third boiler is now being added. Notable is the installation of "Sirocco" induced and forced draught fans with "Vulcan-Sinclair" infinitely variable speed couplings, and "Davidson" dust collectors, representing the latest scientific practice in steam generation.

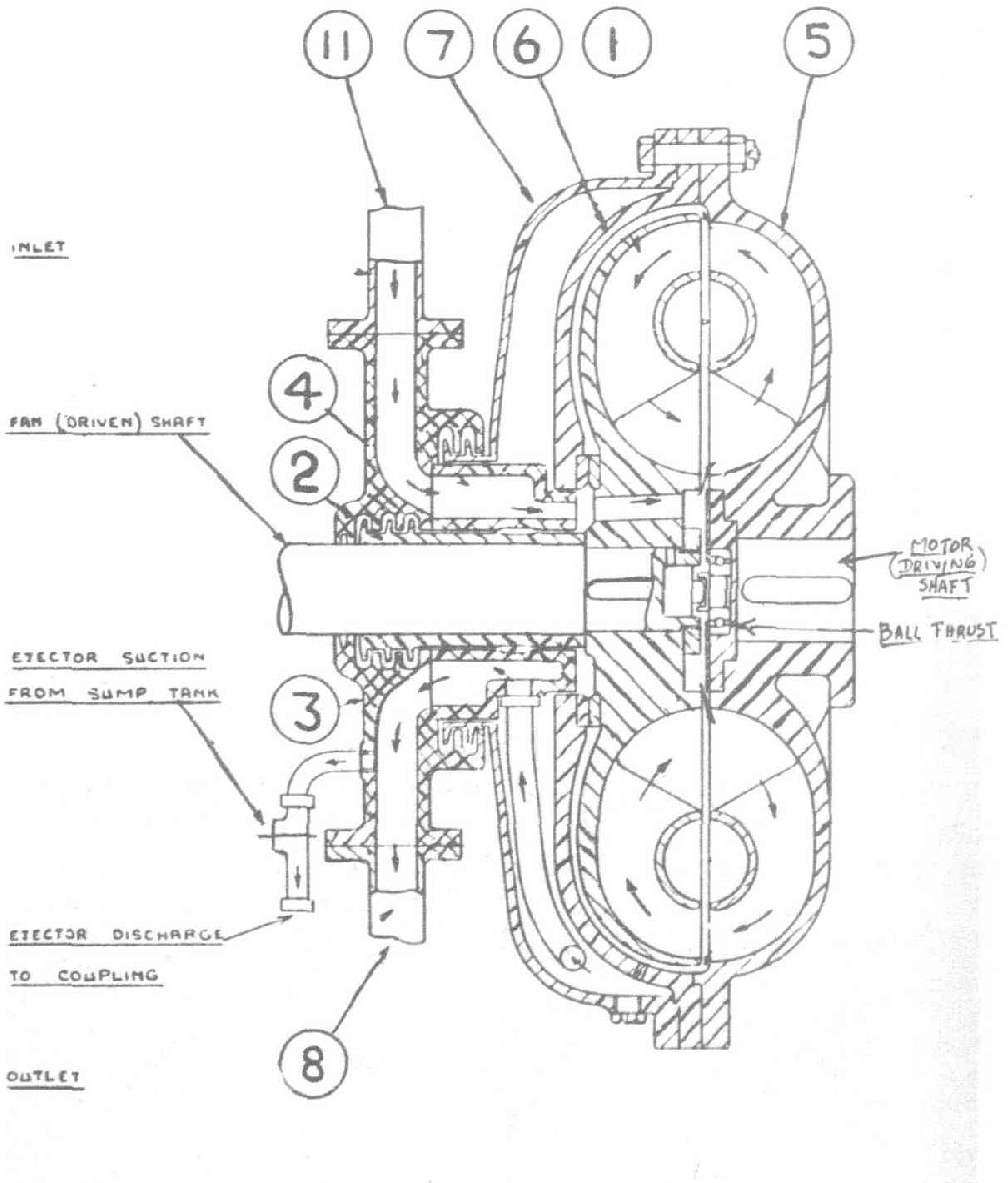
In the case of the two boilers comprising the first portion of the extensions each boiler is fitted with one "Sirocco" induced draught fan of the 60-in. double inlet type, running in conjunction with a "Davidson" "S.S." type centrifugal dust collector. These induced draught fans are direct coupled to a constant speed A.-C. 220 h.p. electric motor running at 730 revolutions per minute through "Vulcan-Sinclair" hydraulic couplings. This allows of an infinitely variable speed being given to the fan, with almost instantaneous speed change by means of a movable weir control gear and oil supply tank from a maximum of 98 per cent of the motor speed down to about 20 per cent of the motor speed. Under the maximum speed conditions also each induced draught fan is rated at a duty of 82,000 cubic feet of combustion gases per minute at 320°F., with a suction of 7.75-in. water gauge in the fan inlet.

Each boiler has in addition one "Sirocco" high duty double inlet type forced draught fan, 40-in. diameter, having a normal duty of 48,800 cubic feet of air per minute at 90°F. with a pressure of 5.25-in. W.G. As before direct drive is used, with an A.-C. motor of 93 h.p. running at a constant speed of 730 revolutions per minute, operating through a "Vulcan-Sinclair" coupling, allowing of

(Continued on page 282)



"Vulcan-Sinclair" Hydraulic Coupling on a Forced Draught Fan with an Electric Motor drive of 65 h.p. Running at 720 r.p.m. with Fan Speed Varied Infinitely as required. Showing also Overhead Oil Tank. This installation is at the Clarence Dock Power Station, Liverpool



SECTIONAL PLAN OF COUPLING

(1) Runner, (2) Sleeve, (3) Stationary Manifold, (4) Scoop Tube Housing, (5) Impeller, (6) Inner Casing, (7) Outer Casing, (8) Oil Return Pipe to Gravity Tank, (11) Oil Inlet Pipe to Coupling

Building the Shing Mun Dam

Difficulties Attending Huge Project Near Hongkong are Described in Address of Mr. G. B. GIFFORD HULL, Resident Engineer

An address which illustrated the immense scale of the work connected with the construction of the Shing Mun Dam at Hongkong was given recently before the Hongkong Rotary Club by Mr. G. B. Gifford Hull, Resident Engineer of the Shing Mun Waterworks Construction Scheme.

Mr. Hull said :— I must say at the outset that dams can be divided into a number of different classes such as the gravity dam, the arch dam, the multiple-arch dam, the slab and buttress dam, the rock filled dam, the earth dam and the hollow re-inforced concrete dam. Of all these we have selected two, the gravity and the arch, as being most suitable for the characteristics of the Shing Mun Valley. The gravity dam, as its name implies, resists the pressure of the water by its weight. It might be said that it is perhaps the most expensive of all these dams. It is usually built of concrete or cyclopean rubble, which consists of very large stones embedded in concrete. Compared with the disadvantage of cost it has the advantage that a spillway can easily be incorporated in this dam. It is also much easier to build because its large dimensions enable what might be called " mass production" methods to be employed in its construction.

The arch dam stands up against the water in a totally different manner. It breasts the water and the water pressure sets up a thrust which is transmitted through the dam to the abutments. In the old days we used to design it as a thick cylinder and before we knew as much about concrete as we do to-day we used to limit the stress in these dams to about 15 tons per square foot. During the past ten years, however, we have found out a good deal about concrete, can considerably improve its manufacture, and now design it to stand 40 tons per square foot. This means that the section of the dam, instead of being wide and costly like the gravity dam, can be considerably reduced and therefore in spite of the increased length due to its curved form this dam is usually more economical. But a spillway in this type of dam, especially in one which is so high as the Shing Mun dam, cannot be easily incorporated for the reason that water flowing practically vertically over this great height acquires a very considerable momentum at the bottom which would be sufficient in some cases to erode the foundations on which it is built.

Arch dams are difficult to design because we do not know exactly how they behave under varying stresses due to varying water load and changes of temperature.

A Historic Experiment

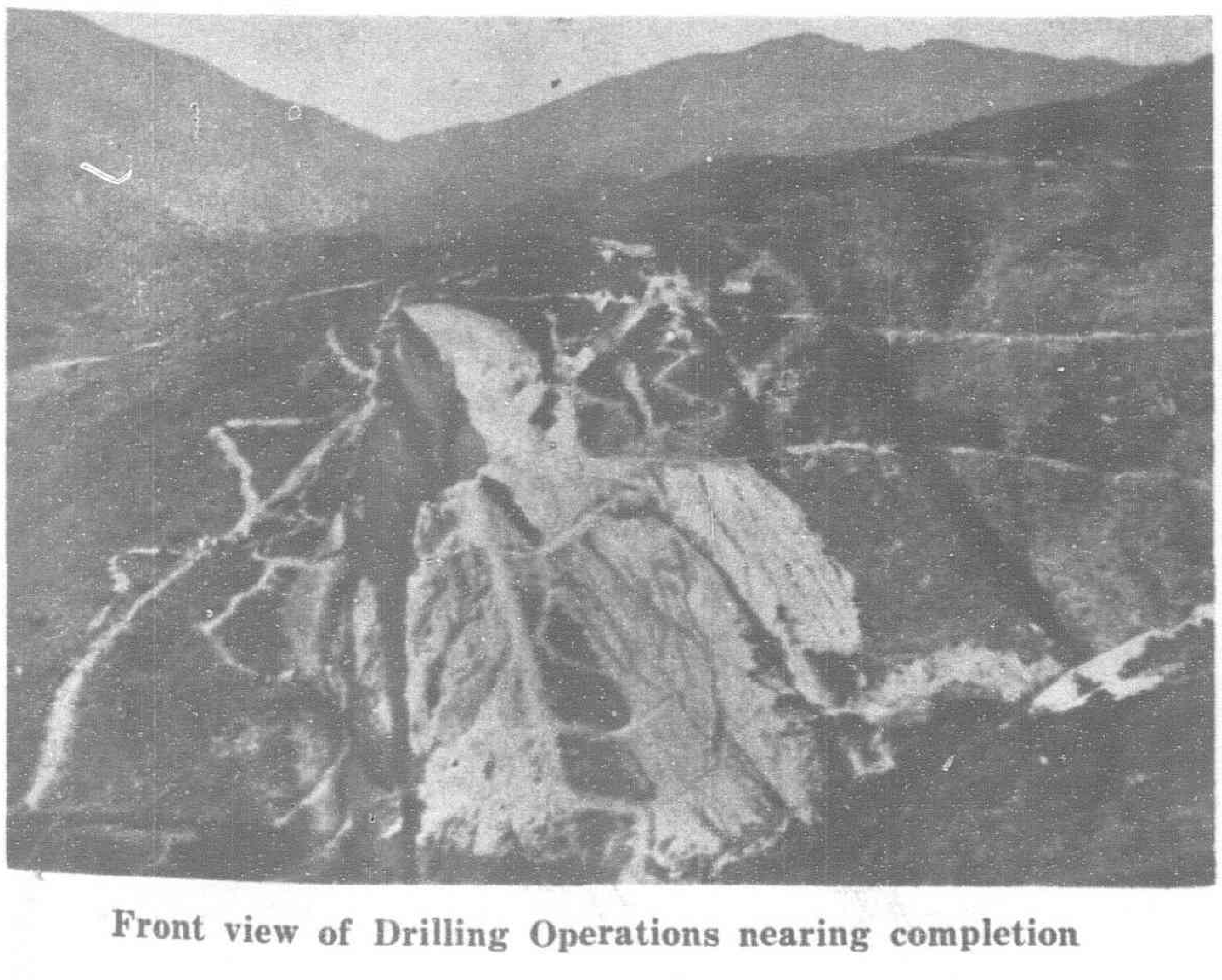
So much money has been and will be invested in dams for water supply, hydro-electric and irrigation purposes that a group of interested people got together some seven or eight years ago and financed the construction of the Stevenson Creek dam, an experimental dam in America. The site was chosen where the river fell steeply and also in such a place that when the dam broke up it would do no damage to the country below. The top 60 feet of this dam was built only two feet thick, and in its upstream and downstream sides steel plugs were incorporated in the concrete and instruments were set up so that the behavior of the plugs in the dam could be observed as the water rose on the inside. Day by day while the water slowly rose these observations were taken. The water finally got to the top of the dam and quite contrary to the general expectations the dam did not break. However, it did bend. The water pressed it in at the middle and pressed it outward at the sides and it created certain new ideas on arch dams and confirmed others.

Full advantage of this experiment, together with the very elaborate mathematical analyses which were made based the behavior of this dam, has been taken in designing the particular kind of arch proposed for Shing Mun.

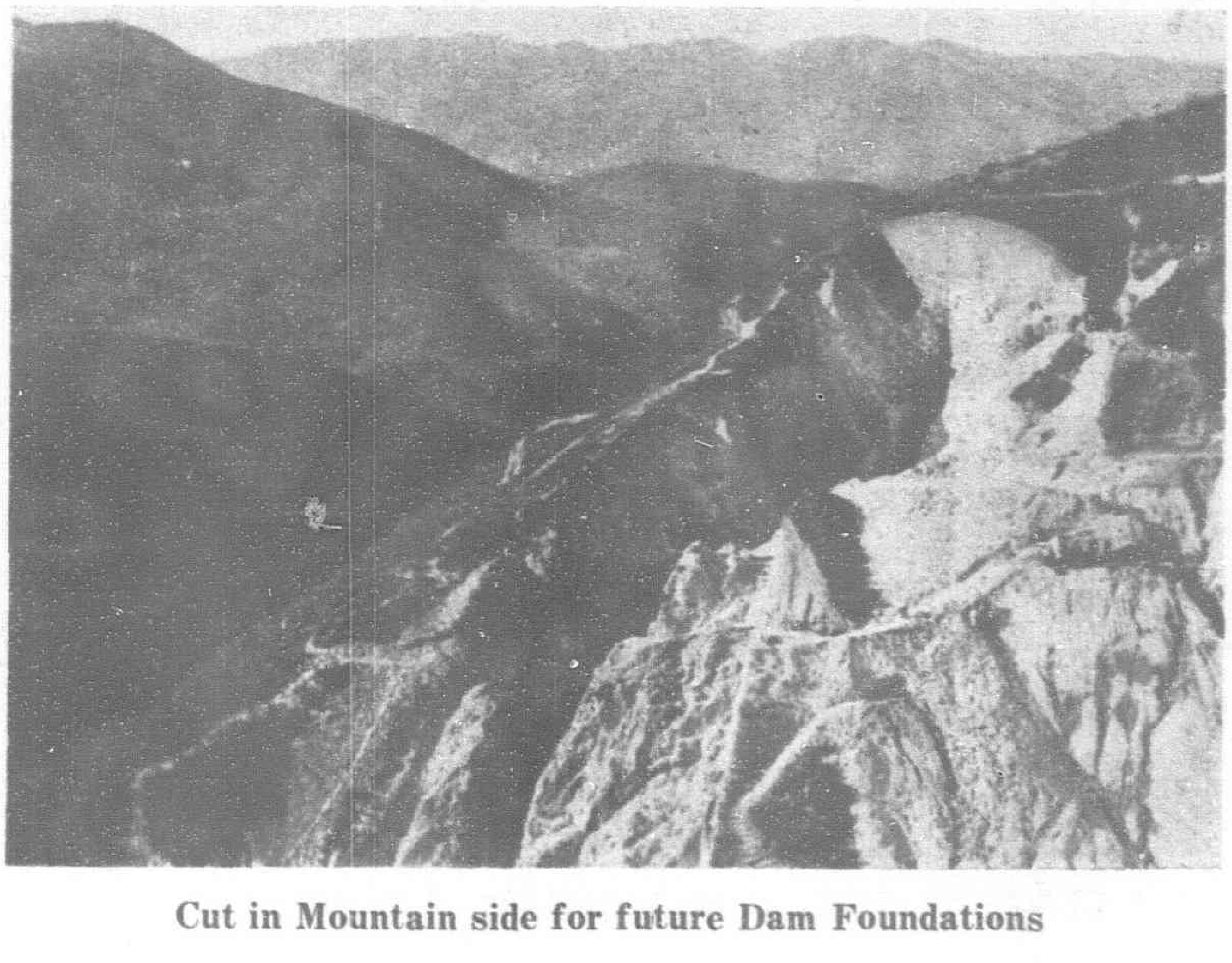
You have perhaps noticed that any valley is narrower at the bottom than it is at the top and it so happens that unless a certain angle is subtended by the arch, the arch itself does not in fact behave as a true arch unless the section is thin compared to the angle subtended, and it is usually necessary to design the lower part as a cantilever ; so that while the upper part of the dam acts as an arch the lower part, while of course arched in plan, acts as a cantilever : and somewhere between the two is an indeterminate intermingling of these two particular types of strain.

In the Shing Mun dam the lower 100 feet is designed as a cantilever and in order to eliminate any uncertainty as to where one kind of stress will end and the other begin, an asphalt joint has been introduced. We shall thus build the dam up to a height of 100 feet and then two inches of asphalt will be put on top of it and then the arch proper will be built on the asphalt, so that two dams will be incorporated in one, both acting independently yet together. If you ask me, however, what happens in the asphalt, I should have to confess frankly that I don't know. I believe, however, that the asphalt, being plastic, will accommodate itself to whatever changes do take place ; and that, being watertight, it will not permit the water to leak and travel from one side of the joint to the other.

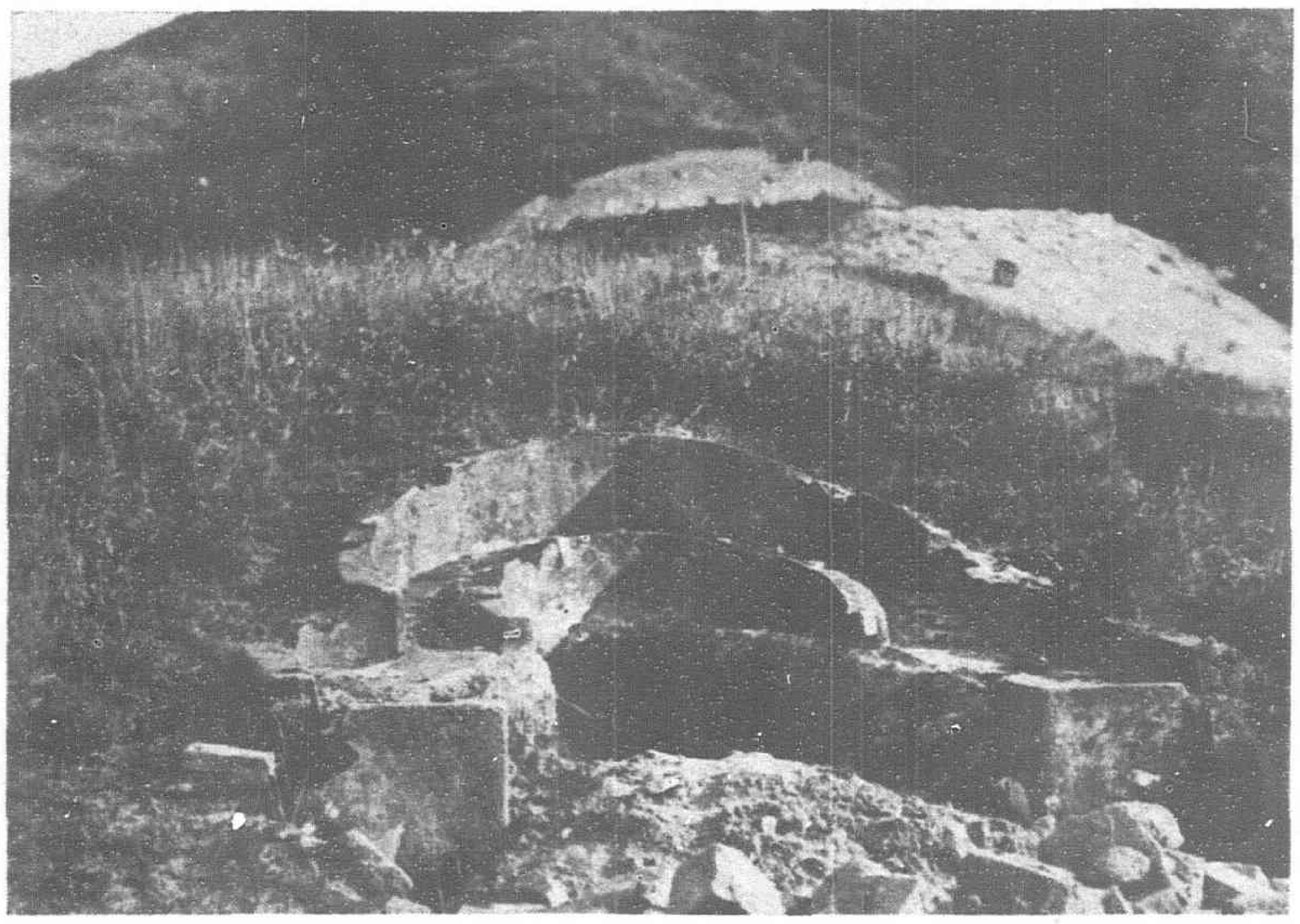
Before we came here there had been a certain amount of very useful exploratory work and drilling carried out by the Public Works Department and we were able to get a rough idea of where we might find the rock down below ; and it seemed reasonable to suppose that we could find it at an economic depth and therefore



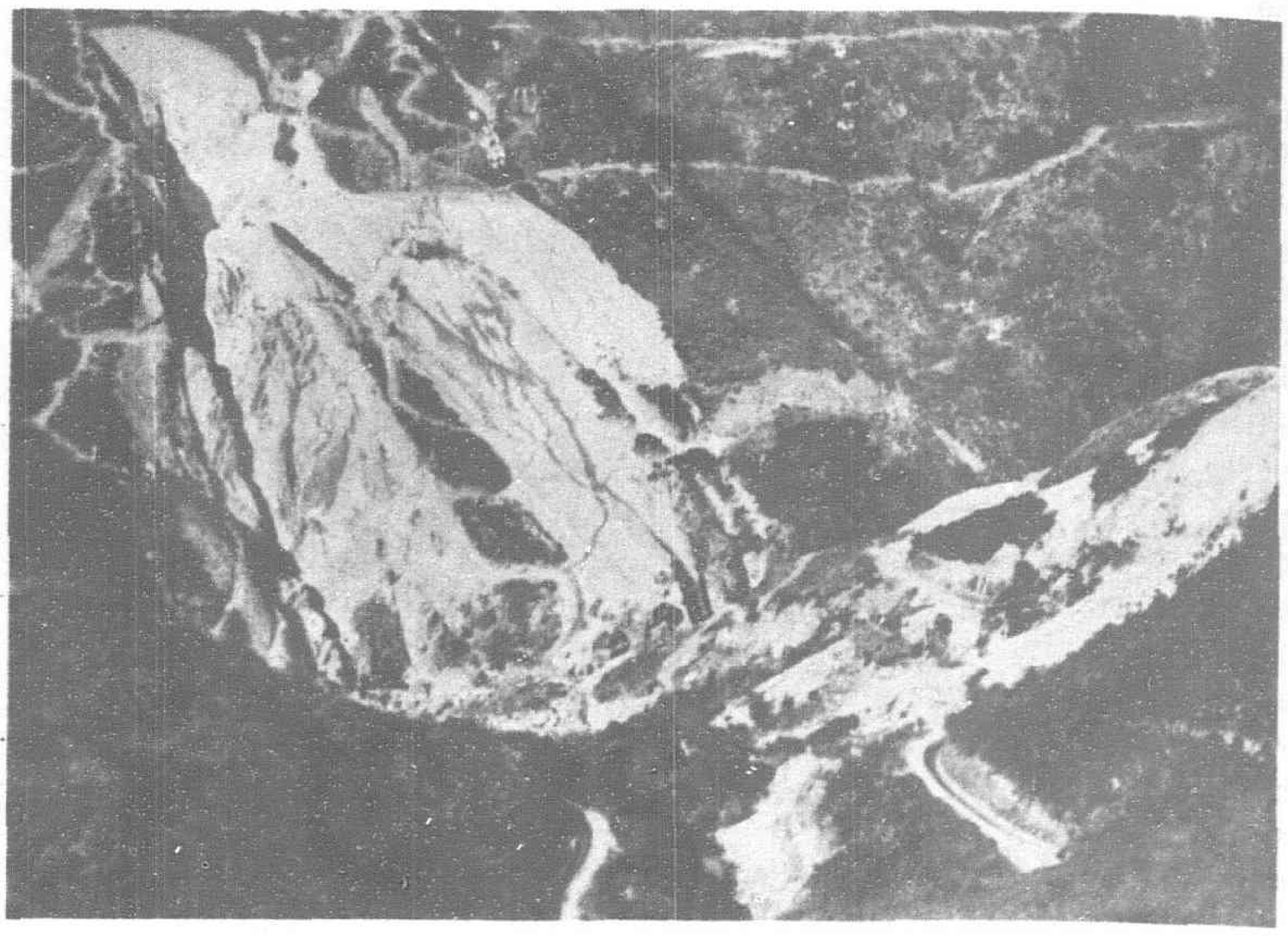
Front view of Drilling Operations nearing completion



Cut in Mountain side for future Dam Foundations



Chinese Tomb uncovered in drilling which was removed



View into Valley in which Rotary Shop Drill Shed may be seen

we have adopted tentatively the arch design. You will understand, however, that whether we finally choose the arch or not depends entirely upon what we actually find down below. Drilling is now in progress, day and night, in an attempt to get the information which is so vital, as quickly as possible. If we find that we have to excavate for the foundations for the cantilever part of the dam, and for the abutments, to a depth which will eliminate the saving in cost expected on the arch design, it may be advisable to change the design and go for a gravity dam lower down the gorge.

Problems to be Considered

I mentioned how difficult it was for a spillway to be incorporated in an arch dam. Most of you know the Shing Mun river has a very small flow in the dry weather when it is almost a mere dribble, and that in the rainy season there is a very considerable flow. If a cloudburst occurs at a time when the reservoir is full, the water, if uncontrolled, would flow over the top of the dam and do the damage that I have referred to just now, and to prevent this the abutments have been designed to act as spillways so that the over-flow water in the case of this dam will flow over the two sides of the dam and not in the middle.

You may be interested to know with regard to the drilling that in two holes drilled in the river bed to a depth of about 60 feet we have found what appears to be sand at a depth of 35 feet. I cannot be certain whether it is in fact sand or whether it is soft decomposed granite ground to sand by the rotating drill tools but of course we shall have to get below this.

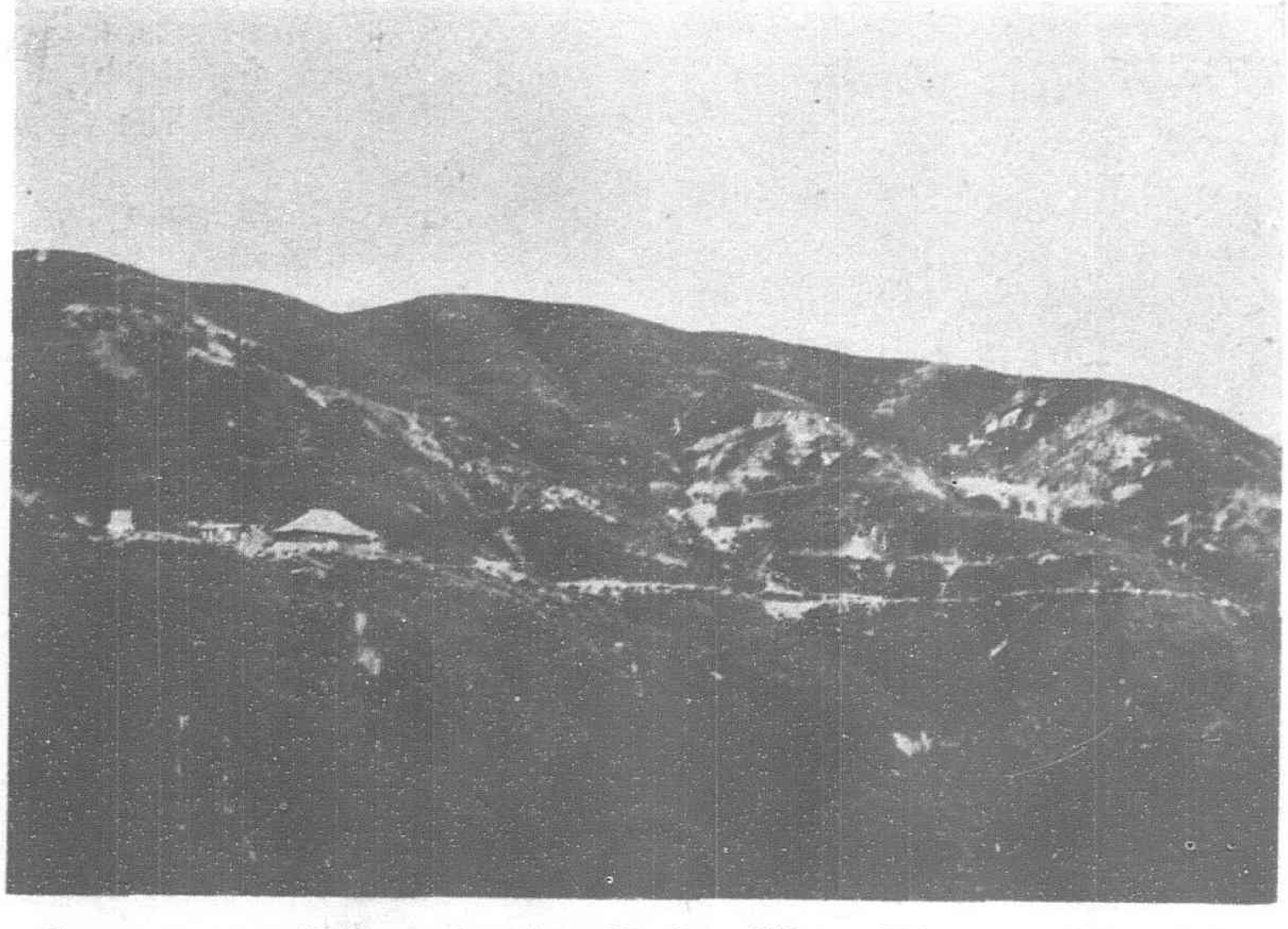
Turning to the construction side of the work it is necessary to plan it carefully beforehand because the cost of the work and progress depends on the construction methods employed. In the building of a concrete dam the first thing you have to look for is the stone with which to build it, and therefore we have to find a suitable place for quarry. In Shing Mun there is no stone within a reasonable distance at a level above the dam. The reason why we like it above the dam is because it is easier and more economical to take heavy loads downhill than to pull them up.

At Shing Mun the only suitable rock is down in the gorge itself downstream of the dam. That means that the stone, when it has been quarried, which incidentally involves winning about 1,000 tons a day, has to be lifted across the valley by a cableway to the crushers on the near side of the dam where it will be crushed preparatory to its being converted into concrete. Once having settled the site of the quarry, which is the heart of the job (because what we are trying to do is to take solid rock from one place and put it in another place in as nearly its original condition of solidity as possible) the rest of the plant and machinery is located with respect to that. After the crushers follows the location of the mixers, and then some means has to be devised of placing the mixed concrete into the dam. One of the most modern methods of doing this is with a chuting plant, but we do not like this particularly because we find that in hot countries the concrete is apt to stick in the chutes: furthermore we like to use dry concrete because it has been found that, to a certain limit, the less water there is in concrete the stronger it is, and in trying to chute dry concrete we find that the larger particles separate themselves from the rest and so nullify the care we have exercised in mixing it. Another difficulty with a chuting plant is that you cannot in this manner put "plums" into the dam. "Plums" are large solid stones, weighing up to five tons or more, which are embedded in the concrete and which have the effect of considerably reducing the cost of the work. We have abandoned the idea of chuting therefore, and have adopted cableways which pick up four to five tons of concrete at a time and carry them to the dam and which will also be able to carry plums of similar weight to the dam.

Making Sand for Project

Another interesting thing about Shing Mun is that there is no sand near the site. You all know how concrete is made. The ordinary rock is taken and crushed to various sizes and then sand has to be added to fill up the interstices in the stone, and cement then added to fill in the interstices in the sand and to bind the mass together. In this place there is no sand nearer than some of the beaches about twenty miles away, so we have to pulverize our own sand with machinery that picks up small stones and flings them against steel plates which has the effect of converting them into sand of different sized grains.

The method of construction was decided in December last and full specifications of the machinery required was sent home to England then and is now being manufactured there. Meanwhile we have to go on with the preliminary work and we are now building a camp for a thousand or so coolies,



Scene across Valley showing Native Silver Mines on Mountain side near Dam Site bungalows and quarters for the European engineers and foremen and the ordinary store and office buildings, etc., required for a job like this. We are also carrying out anti-malarial work and we have been favored with the help of Dr. Wellington and Dr. Jackson who are giving us full advice and assistance in this important matter. We have now drained five of the rice fields which covered that area and which were prolific breeding places for mosquitoes and have besides drained many other ravines. Incidentally I might say that we have had dealings in the past with a number of Governments in various countries, but I have never known anyone to work so quickly as the officials in this place, because when I told them that we wanted to remove the ricefields the necessary negotiations were so rapidly made that three days later we were actually at work in them.

We are also building a hospital to deal with accidents which are almost inevitable on jobs of this kind, and for ordinary sickness which has to be looked after before the patient can be sent to a bigger hospital. The Police have been very kind to us also and we are building a Police Station there to look after any unruly coolies we may have.

Plans for Excavation Work

When construction actually starts, the first thing to do is to excavate for the foundation of the dam, and when this has to be made across a river some provision must of course be made for the water which would flow into the hole thus made. In the case of very wide rivers we often have to build a coffer-dam, enclosing, say, one-third of the width of the river at a time, pumping the water out and building the first part of the dam inside the coffer-dam leaving holes through it in order that later on the water may be diverted through these holes so that the rest of the dam can be built.

Another way is to drive tunnels round the dam and to divert the water through the tunnel so that the excavation for the dam may be carried out in the dry. But in the case of the Shing Mun river itself, the width and character make it more convenient to build a flume, which is a wooden trough carrying the water across the foundation.

The most important part of a dam is that part which nobody sees after the dam is finished, in other words the foundation on which it is built. When we finally reach the rock we find that while it may be sufficiently solid to carry the weight imposed upon it, it is not watertight by reason of the fissures which are so frequently met with especially in granite. In the early days we used to get below these fissures by sinking a trench on the upstream side of the dam until we eventually did find watertight rock, and we have in some cases carried trenches of this kind down to the great depth of 180 feet. Now, however, we have found out a cheaper way of rendering fissured rock watertight and that is by "grouting." We drill holes fifteen or twenty feet apart, thirty or forty feet deep into the rock and force in "grout" under a pressure of about 100 pounds per square inch. "Grout" is a mixture of cement and water and looks like cement milk and it has the effect of penetrating into the fissures, under the pressure behind it, and sealing them and converting the mass into a watertight foundation.

Is Four Years Job

I suppose you would like to know something about the time necessary to complete this dam, and I might say that we have allowed somewhere about four and a half years for this. We do not want to build it too quickly, not, of course, for our own sake, but because it is better for the work. When you add water to cement, a chemical reaction is set up which generates heat and you all know that anything that is hot occupies a bigger area than the same thing does when it is cold. If we build this dam too quickly and put successive layers one on top of the other we are not allowing the air to get to the concrete to permit the heat to dissipate slowly. We would therefore, be, so to speak, bottling up the heat which is not good for the work. We are limiting ourselves to roughly five hundred cubic yards a day, which will enable us to build the dam, if we are favored with good luck and weather, in about four years. It would not be a service in Hongkong if we went for record-breaking speed in building this dam. We shall, however, when the dam is well above ground, begin to bring the water up with us, and I very much hope that well before the period I have just mentioned, Hongkong's water troubles will be over.

We are all extremely pleased that we have such a nice place to work in as Shing Mun. It is a perfectly lovely place and is much superior in scenery and climate to many other places I have previously worked in, and later on when the lake is completed it ought to be an ideal place for a Hongkong week-end.

Mr. Hull concluded the address by thanking his audience for the interest they had shown in his address and thanked the Rotary Club for the opportunity afforded him of explaining some of the work entailed in the construction of the Shing Mun dam.

A Local Pioneer

Proposing a vote of thanks to Mr. Hull, Professor Middleton Smith referred to the recent appointment of Hon. Mr. R. M. Henderson as Director of Public Works and mentioned the fact that he was one of the pioneers of the present scheme, and said that grateful as they would be to Mr. Hull and his collaborators they could not forget the efforts of Mr. Henderson for the benefit of the populace in this connection. When he thought of the work Mr. Hull had been doing, it made him contrast the life of the engineer with that of a doctor. The great difference between the two was that when a doctor made a mistake he buried it but when an engineer made a mistake it buried him.

He made reference to the opening of the Ty Tam Tak Reservoirs in 1915 at which he was present when Sir Henry May, who opened it, stated that they would have enough water then to last for twenty years, but after five or six years it was found necessary to seek another reservoir and the pioneer work on the Shing Mun scheme was begun.

New Steel Pipe Firm Formed

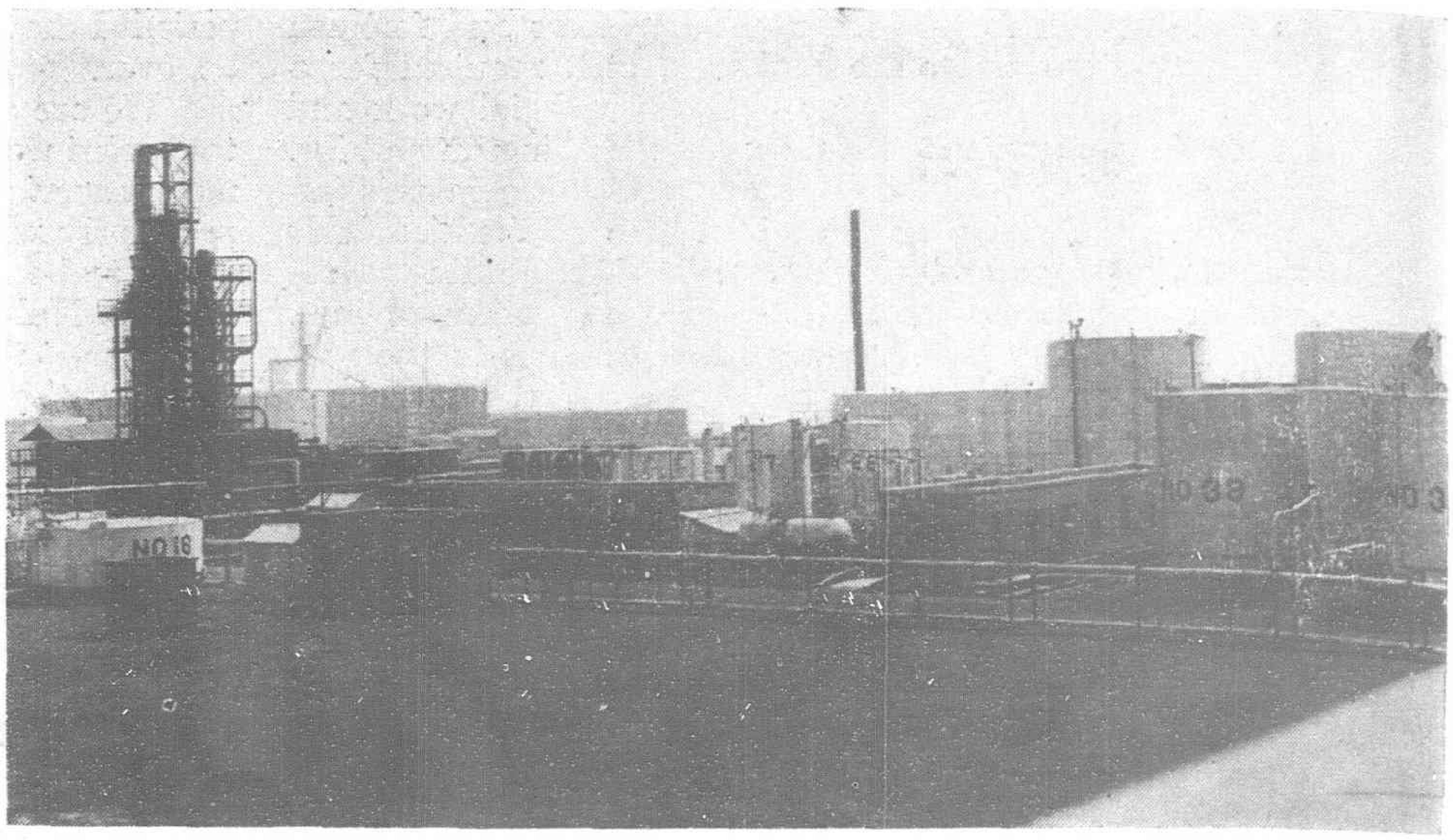
Formation of a new Y.3,000,000 steel pipe manufacturing corporation in Japan now looms, and the news is drawing considerable interest from the nation's iron and steel circles. The plan has been developed from the negotiations made among leading industrialists of the country such as Mr. Nobotoshi Odagiri, managing director of the Kawasaki Shipbuilding Company, Mr. Masao Shibusawa, president of the Fuji Steel Works, Mr. Kaname Sukane, managing director of the Fuji Steel, Mr. Shigeo Nagano, director of the Fuji Steel, Mr. Ryozo Asano, director of the Fuji Steel, and managing director Mori of the Showa Fertilizer Company. It is understood that the new company will be operated under the joint financing by the Kawasaki Shipbuilding Company, the Fuji Steel Company and the Showa Fertilizer Company.

It was revealed that details of the plan for the new steel pipe manufacturing corporation are as follow:

1. The company will be named the Showa Steel Pipe Company.
2. The company will be capitalized at Y.3,000,000, fully paid up.
3. The Kawasaki Shipbuilding Company will invest in the new company approximately Y.1,500,000 in the form of manufacturing machinery, including blast furnaces, while the Fuji Steel Works and the Showa Fertilizer Company will offer Y.7,500,000 each in cash.
4. The new company will specialize in the manufacture of steel pipes, aiming at an annual production of about 60,000 tons.
5. The new company plans self-supply of steel slabs.
6. Products of the new company will be marketed from the beginning of next year.
7. Site for plants of the new company will cover 30 to 40 thousand tsubo adjoining the site of the Nippon Steel plant at Kawasaki City, Kanagawa Prefecture.

While it is thought that a far-reaching effect will be felt in the steel pipe trade in the future due to the rise of the new company, no immediate competitive effect on the business of the Nippon Steel Pipe Company, which has hitherto been the only steel pipe manufacturing enterprise in Japan. The Nippon Steel Company produces about 80,000 tons of small and medium size pipes, which constitute a little over 50 per cent of the total consumption within the country. The nation depends on imports for about 60,000 tons of large size steel pipes. Evidently the new steel pipe company aims to check importation of large size pipes.

Petroleum Products in Japan; The Mitsubishi Oil Company, Limited



Light Crude Topping and Cracking Unit, Cross Type, 3,000 Barrels daily; Lubricating Oil Distillation Unit, 1,000 Barrels daily; Re-run Unit for Re-running Pressure Distillate, 2,400 Barrels daily

Japan's production of petroleum is only a very small drop in the bucket of the national demand for fuels and lubricating oils. The Japanese companies engaged in drilling, producing, and refining oils, the Nippon Sekiyu K.K. (Japan Petroleum Co., Ltd.,) and the Ogura Sekiyu K.K. (Ogura Petroleum Co., Ltd.) have been dependent on foreign supplies of crude oil to maintain their production of refined products at capacity.

Five years ago the Ogura Sekiyu increased its refining capacity and began the manufacture of lubricating oils. Its methods of competition have kept the Japanese market for all petroleum products in an active condition and materially affected the profits of its competitors.

During the last thirty months the Japanese petroleum market has been growing steadily worse, just as it has in the United States and other producing and distributing centers. But considering that Japan does not produce more than one-tenth of the crude oil annually consumed in its refineries, it is a remarkable fact that the market for refined products and the prices paid for them are even worse than conditions abroad warrant.

The greatest part of the crude oil consumed in the Japanese refineries is now imported from the United States and Saghalien. During the last three years Soviet Russia has made more or less determined efforts to enter the market both for crude oils and refined products, but the terms of contract have never been satisfactorily worked out with the Japanese buyers who have always fondly believed that Russian products must be dumped, and therefore cheaper than any other similar commodities from other parts of the world. But the Russians have thought otherwise, at least so far as the Japanese market for petroleum products is concerned and have so far resisted the temptation to supply petroleum to Japan at prices which mean a loss to the producer. A contract was almost concluded recently with a group of Osaka capitalists, but at the last moment the Japanese buyers backed out claiming that the Russian method of price calculation made it impossible to do business in Japan. Though they had the idea that business would be possible if the Russians would agree to supply all their petroleum products in Japan at a basic price which would always be at least 10 per cent below the market price in Japan for similar products. No contract was signed.

The Nippon Sekiyu K.K. is materially assisted in its operations by the Navy Department. Though it is believed by petroleum experts that this company would be in better condition if it were not obliged by the terms of its agreement with the Navy to undertake a fixed amount of new drilling in the rather poor Japanese oil fields in North Japan and Formosa. Apart from its own wells, the Nippon Sekiyu obtains part of its crude oil supply from Karafuto, and from North Saghalien.

The newest and perhaps the most important company in the refining field is the Mitsubishi Sekiyu K.K., organized in February, 1931, with joint American and Japanese capital.

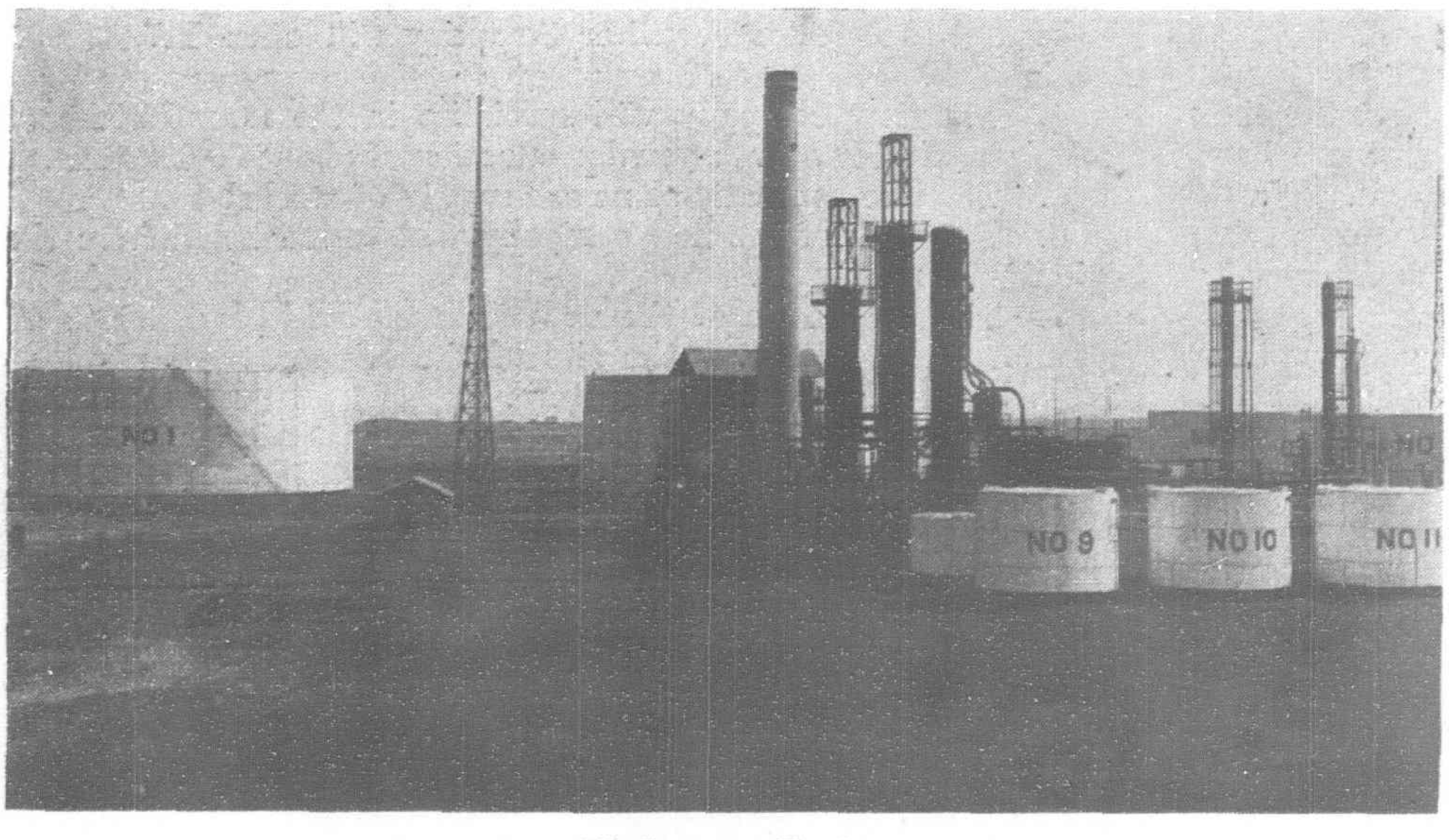
The American interest is the Associated Oil Company of California, the Japanese interest the Mitsubishi Goshi Kaisha, of Tokyo. The authorized capital is Y.5,000,000, of which each interest holds half. By contract the new company obtains its supplies of crude oil from the Associated Oil Company. The President of the new company is Admiral Funakoshi, well known in other activities of the Mitsubishi financial group, and the Vice-President is D. D. MacGregor, of the Associated Oil Company.

The new company has erected a refinery at Tsurumi on the bay shore between Tokyo and Yokohama. Although at the present time its principal interest is the production of gasoline it is equipped to produce a complete line of petroleum products and will enter new fields gradually as the products taken up at any one time are satisfactorily placed on the market.

The light crude oil topping and cracking unit is of the Cross type, modified to run through 3,000 barrels of crude a day. The re-run unit for re-running pressure distillates has a capacity of 2,400 barrels a day. The Lubricating Oil Distillation unit can handle 1,000 barrels a day. This makes this the largest and most important petroleum refining plant in Japan. Operation began the end of December, 1931, but was not on a satisfactory basis until February this year.

With the appearance of the new Mitsubishi gasoline on the market in Japan, gasoline prices went to pieces. Not entirely because of this new competition, but because of the over-supply which has always to meet keen competition with low grade gasoline flooding the market from the Ogura Sekiyu refinery. Efforts have been made to get the refineries and the importers, the Standard Oil Company, and the Rising Sun Petroleum Company, to agree to a quota basis of production and import. But so far all efforts have been without any satisfactory result. Price agreements have always been broken, and the gasoline market is in a highly disturbed state.

Some import of Russian Crude Oil from North Saghalien was made in the summer of 1931. It is expected that this will be much increased; one contract has already been announced for 50,000 tons to be sold to the Kita Karafuto Sekiyu K.K., a crude oil production and distributing company, not interested in refining. But a great part of this supply will go to the Japanese Navy, which is reported as in the market for a very large reserve supply of fuel oil.

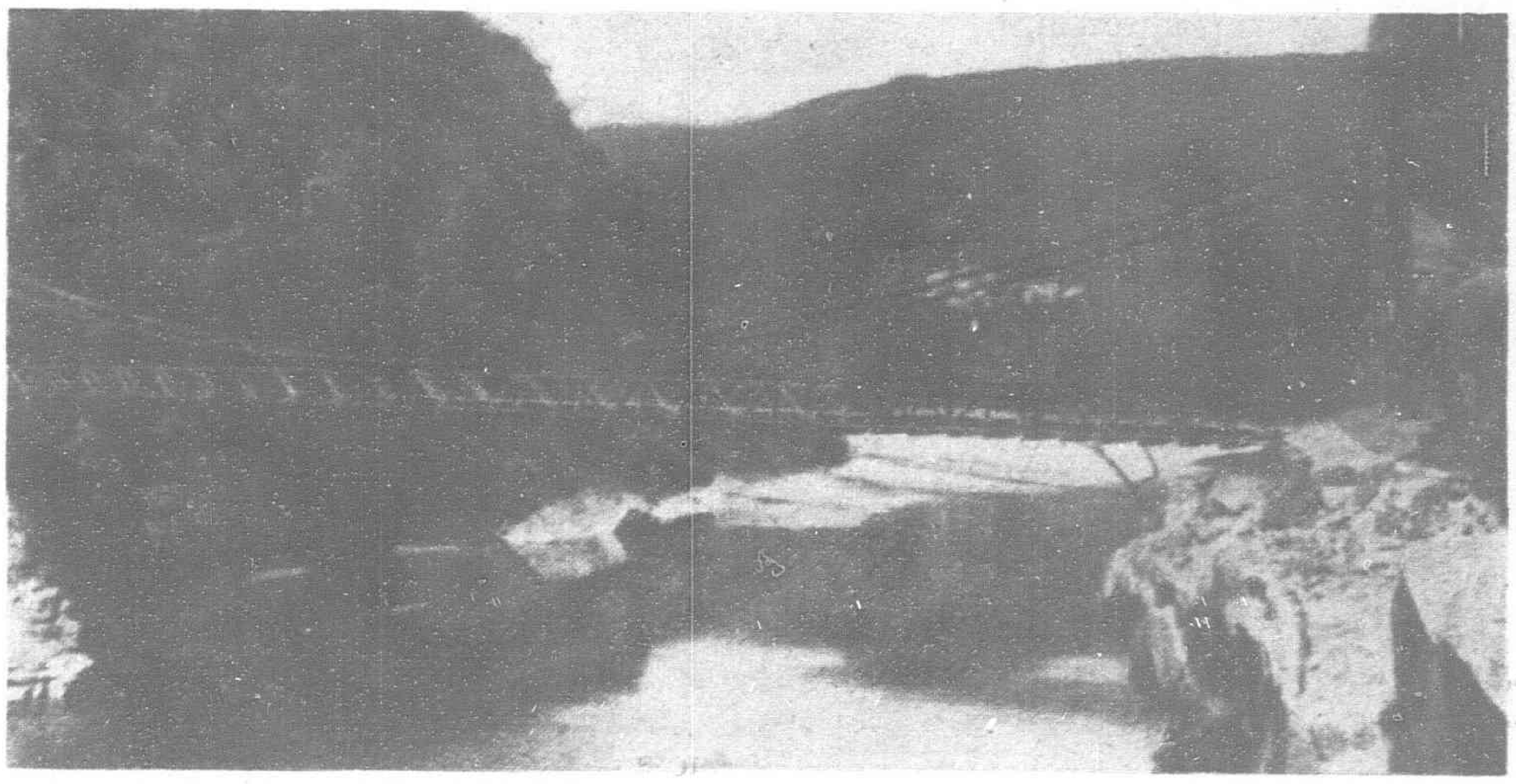


Oil Storage Tanks

Road Construction in Assam

Linking Up Assam's Valleys

By DAVID PATERSON, F.R.S.A., A.M.I.M.E. in "The Planters' Journal"



Suspension Bridge carrying the New Shillong-Sylbet road over a narrow gorge. Constructed by the Kumardhubi Engineering Works, Ltd., the bridge is 350 feet long

THE new Shillong-Sylhet road was opened by H. E. Sir Michael Keane, K.C.S.I., C.I.E., I.C.S., Governor of Assam, on March 22, 1933.

The road follows the Shillong-Cherra road for about fourteen miles, and then takes the road to Laitlingkot, which is reached in another three miles or so, rising to an altitude of some 6,100 feet—about 1,200 feet above the altitude of Shillong.

It is intensely bleak country, reminding one of certain parts of Cumberland, and this was intensified on the day of the opening, which took place at Laitlingkot, with black rolling clouds, threatening rain, and a bitterly cold wind blowing.

Away as far back as 1824, a communicating road was contemplated connecting the two valleys. This road pioneering is closely associated with the name of David Scott who, as Agent to the Governor-General, gave the order for the road. A few years later, in 1827, a road was attempted, but the Khasis, who were then a treacherous and cruel people, massacred a party of the road makers. Eventually a road was put through from Cherra to Shillong, but communication from the plains to Cherra was by zigzag paved path up the steep precipitous hills which terminate abruptly at Cherra. A road was built from Bollygange to Sylhet, but owing to the prodigious rainfall on the hills immediately above, averaging close on 500 inches per annum, it became impossible to keep up this road, and it was allowed to fall into disuse, some of the bridges being removed elsewhere, where they were more useful.

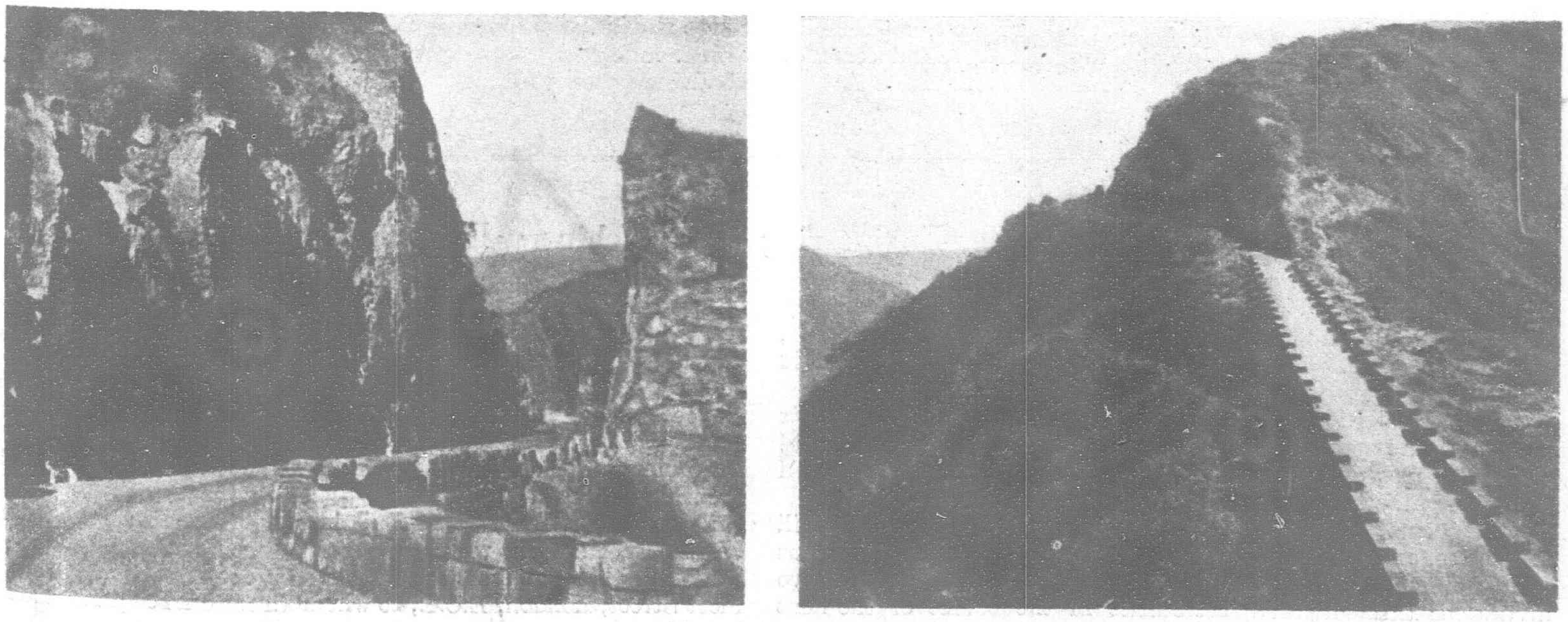
From Laitlingkot the new road begins to descend, and again in a few miles rises to almost the same altitude. The country is wild and rugged, intersected by gorges of tremendous depth, ranging from 1,000 to 1,500 feet almost sheer perpendicular. The road here is cut for miles out of solid rock, along the precipitous sides of the gorges, where, visualizing the work required for making the original survey, the engineers must have appeared, literally, like flies upon a wall. As we travel along in a smoothly running modern car, sitting at our ease, and enjoying the cool fresh breezes of the hills, can we fully realize the tremendous risks involved in obtaining a foothold, not to mention the carrying of theodolites, etc., and finding a ledge to put them on? In some places this was not possible, and staging had to be constructed on which to place the theodolites. An extraordinary feature of the formation of the hills here occurs.

As we motor along we suddenly begin to realize that we are riding straight for the edge of a gorge, and wonder how ever we are going to reach the other side, when we emerge on to a narrow saddle-back only the width of the road, and walled up, to make quite certain of safety, the valley on either side descending abruptly to probably 1,500 feet below. Had it not been for this saddle-back, it is difficult to understand how the road could have been carried on short of constructing a huge suspension bridge.

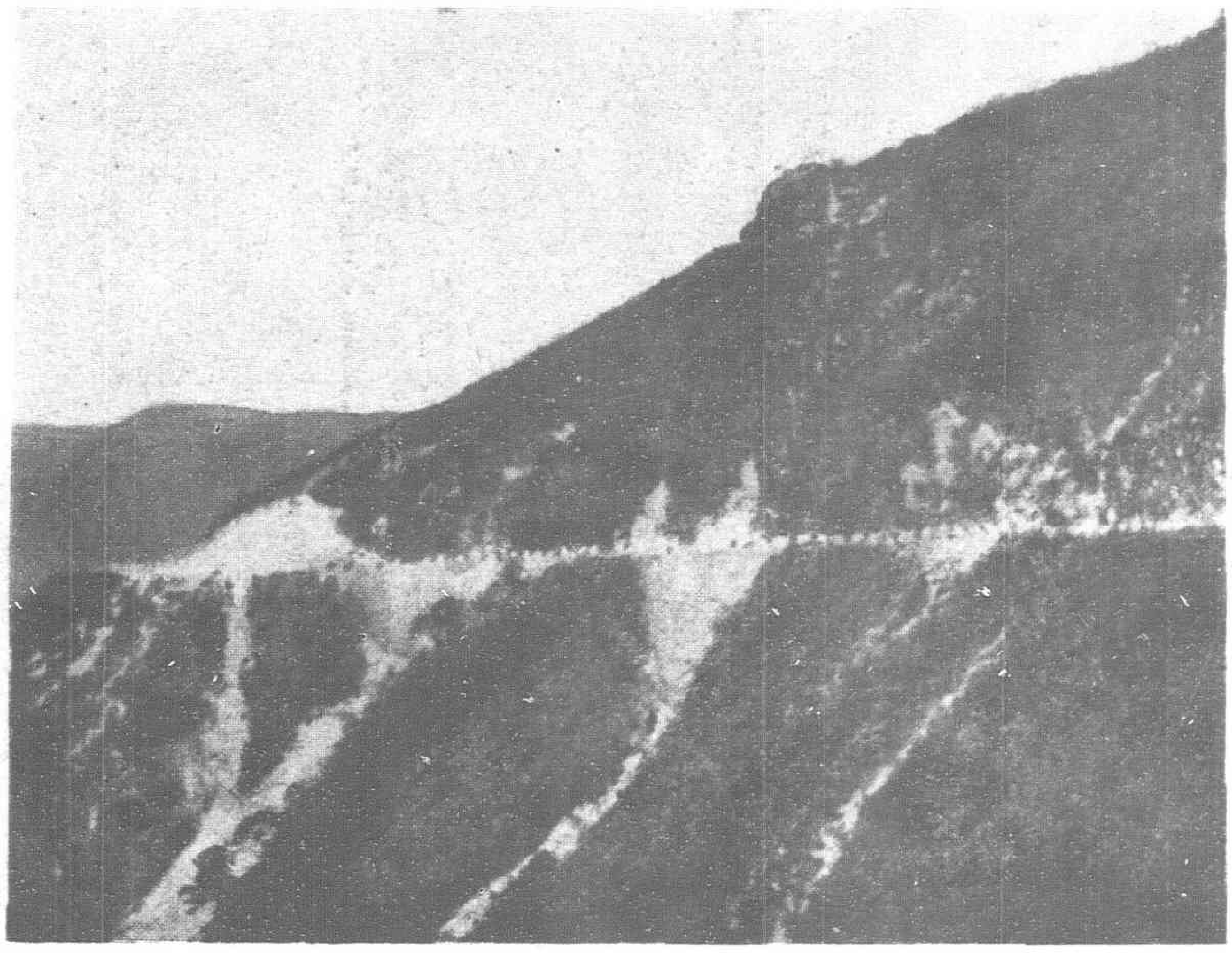
From this point we shortly descend fairly rapidly until we reach Penusala, which is a grassy plateau about 4,000 feet above sea level. Here the rainfall is almost as heavy as it is at Cherrapoonji, last year registering some 400 inches. The constructing engineer's bungalow, with some of the houses for the subordinate staff, is situated here. Here also is a colony of Nepalese, who were induced to settle with their cattle in order to provide milk; for strange to say, the Khasia people do not drink milk, and only breed cattle to sell to Nepalese, or for the butcher. Incidentally, milk for the tea party at Laitlingkot, on the day the road was opened, had to be transported from here—a distance of 14 miles.

From Penusala the country is less precipitous, and shortly thereafter the road winds through pretty glades, through wooded country, which is a paradise for orchids and the home of many of the finest we have, many of which we noticed were in full bloom hanging in long festoons, and scenting the air deliciously.

This part of the road must present a very different picture now from what it is later on, when the monsoon is in full blast, when instead of the balmy breath of spring there is the dank fœtid smell



Views of the New Highway as it winds its way through Mountainous and Rugged Country



Another view of the New Shillong-Sylbet Road

of decaying undergrowth, the monotonous drip, drip of continuous rain, the noises from the throats of myriads of insects, and the horrible melting feeling of the hot, intensely humid atmosphere.

We continue descending, the plains spread out far away below as if on a map. At last we reach the foot of the hills, we breathe our last sigh for the splendours we have seen, and prepare ourselves for the drabness of the plains. Suddenly we swing round a corner and our eyes meet with a most picturesque scene, a graceful suspension bridge crossing a gorge about 200 feet above the bed of one of those pretty rivers which debouch on to the plains with a roar as if they refuse to become merged with the mud and marshes thereon, but fling themselves down with derision and scorn.

This suspension bridge is some 350 feet long and must have cost those in charge many sleepless nights. The approaches leading to and from are cut out of the solid rock in a narrow gorge, with cliffs rising 300 to 400 feet sheer perpendicular. The anchor bolts holding the eight cables, each of which weighs 4½ tons, are taken back in tunnels into the solid rock some 50 feet, and filled with concrete. The bridge has a safe carrying load of 16 tons, and was made by the Kumardhubi Engineering Company.

An old fakir, who lives in a cave nearby, shook his head doubtfully when he saw steel ropes being slung across the gorge, in the initial stage of the construction, but had to admit the magic of the engineers, when a heavy steam road roller was put across it as a test after completion.

From Dowki, the village close by, the road proceeds to Jaintiapur, through marsh land with high elephant grass, and which annually gets inundated to a depth of 10 to 12 feet. On this portion there are numerous bridges, several of them large ones, ranging up to 230 feet in length. The present construction here ends in this old historical place, coinciding with the site to which the old Jaintia Kings penetrated to on the plains. Here is an ancient shrine, one of the fifty-one famous shrines sacred to Doorga, mentioned in Pauranik and Tantrik literature, and which is preserved under the Ancient Monuments Act. But horror of horrors, inside the walls, the modern priest has erected a modern shrine with a glaring corrugated-iron roof!

There also exists the plinth, in front of this modern monstrosity, on which human sacrifices were made, cup-shaped and brick-built, some ten feet in diameter and three feet or so in height, but recently this has been plastered over on the top with Portland cement!

Have the executive body of the Ancient Monuments Act no jurisdiction to prevent such incongruities being perpetrated?

Although Sylhet can now be reached from here, in the dry weather, it will be some time before the metalling of the road will be completed throughout to that town.

It is contemplated to link up Jaintiapur with Silchar. There is a perfectly good alignment from here to Loobah tea garden, along the old Local Board road. This road has been neglected for many years through lack of funds. One large river has to be crossed, otherwise there are no physical difficulties, and actually there is only a distance of seven miles between Jaintiapur and Loobah which is not motorable at present. If this missing link was forged, it would be possible to motor from Silchar to Shillong.

The mileage is as follows: Shillong to Dowki 51 miles, Dowki to Jaintiapur 6 miles, Jaintiapur to Sylhet 30 miles, Jaintiapur to Loobah 13 miles, Loobah to Silchar 50 miles; total from Shillong to Sylhet 87 miles; total from Shillong to Silchar 120 miles.

400,000 tons of solid rock and some 600,000 to 700,000 tons of stone and earth have been removed in the construction of the road from Laitlingkot to Jaintiapur, and the improvement of the old road from Laitlingkot to its junction with the Shillong-Cherra road, and has cost Rs. 22½ lakhs. The road has an easy gradient, nowhere exceeding 1 in 14.

Great credit is due to the Engineer-in-Charge, Mr. F. E. Cormack, and all his subordinates in carrying out such a difficult and important piece of road construction.

The road has cost Rs. 22½ lakhs to construct, the Central Government contributing Rs. 1.80 lakhs, being the cost of the suspension bridge at Dowki. With the exception of the latter sum, the money has been borrowed from the Central Government.

It does seem to be a strange procedure that the Province of Assam contributed to the Government of India in 1932 Rs. 1.23 crores in excise through the Assam Oil Co., Ltd., alone, as stated in Mr. Roffey's speech recently in the Legislative Council, and yet has to borrow money for road construction; if even half—but we demand we are entitled to more—this was given to the Provincial Government, budget deficits would be wiped out, as well as all loans in a very short time. Surely there is something wrong here? Assam is a rich province, between tea, oil and coal, yet it is beggared to such an extent by appropriations of the Central Government, that its finances are in a parlous condition. We look to the Central Government for more fair dealing in the very near future.

1933 Shipping, Engineering and Machinery Exhibition

The date of the Twelfth Shipping, Engineering and Machinery Exhibition has been fixed for September 7 to 23, 1933, at Olympia, London, England. The original event of the series was held in 1906.

This Exhibition has always attracted engineering interests in China, and important representatives from this country have had frequent opportunities of attending and addressing distinguished technical gatherings at Olympia.

The usual number of official visits—about 64 in all—will take place, and the Members of all those Societies and Institutions who are habitually entertained at the Exhibition will receive invitations through their secretaries in the course of the next few weeks.

The Exhibition promises to be of a more novel and comprehensive character than ever, the imposition of the tariff having stimulated British invention and manufacture in many fields so that all the latest marine and general engineering products will be displayed.

Applications for copies of the official bulletin, giving advance particulars of the principal exhibits, and published in English, French and Spanish, should be made to the Organizers, F. W. Bridges & Sons, Ltd., Grand Buildings, Trafalgar Square, London, W.C.2., England, who will mail these free of charge.

With the compliments of Press Contacts Ltd. 3, Bolt Court, Fleet Street, London, E.C.4., to whom all editorial enquiries should be addressed.

The Sugar Industry in Kwangtung*

By ROBERT L. PENDLETON

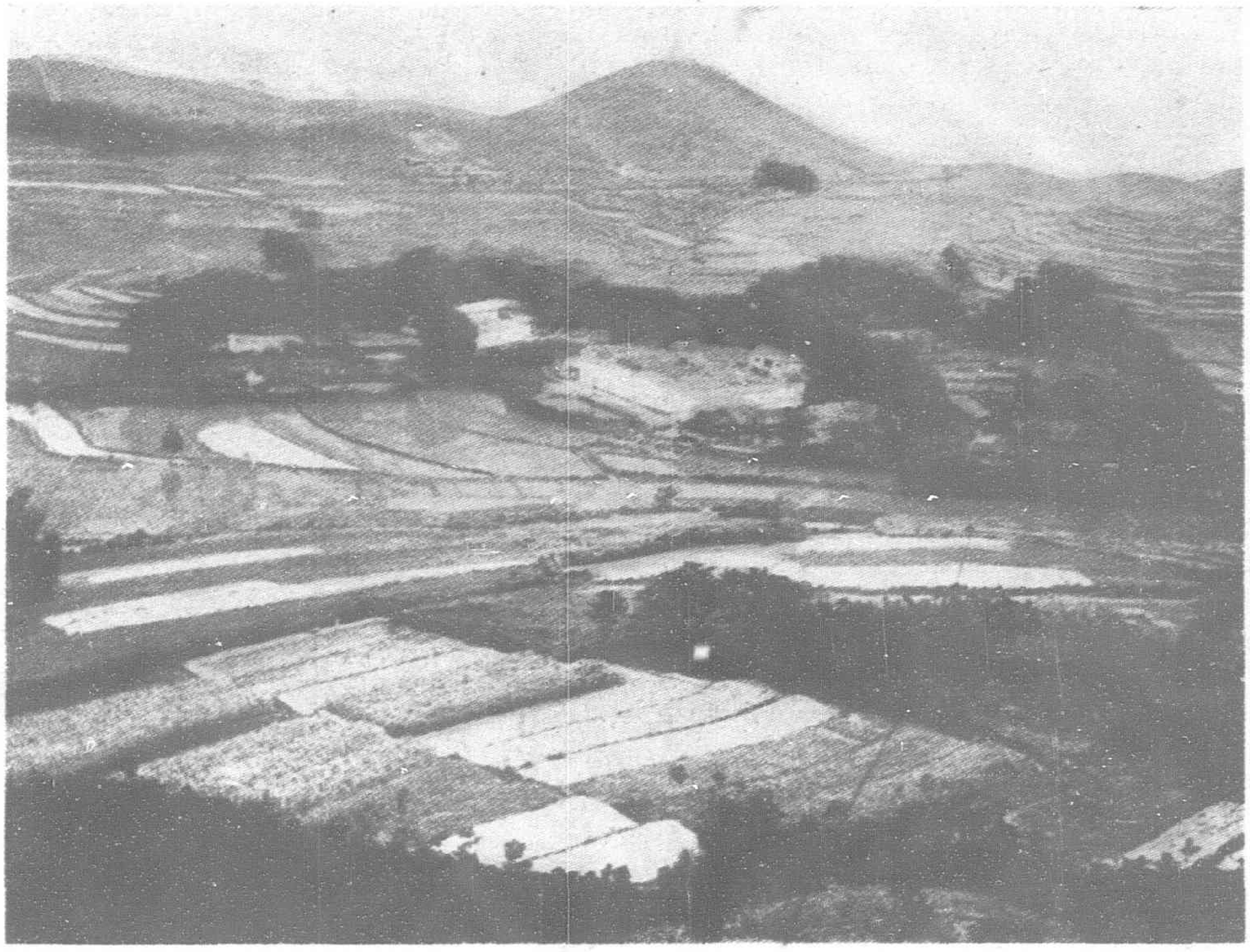


Fig. 1.—In foreground on Lower Slopes are Terraced Fields, some planted to Sugar Cane, some to Sweet Potatoes and others to Peanuts, while some Fields had been planted to Lowland Rice, these being Crops frequently rotated with Cane in the Tamshui Valley, about 65 km. North-east of Hongkong

At one time China produced much more sugar than she does at the present time. In the Philippines it is also generally realized that China has been one of the more important markets for Philippine muscovado sugar. During the last few years, however, there has been an increasing amount of white, more or less refined, sugar imported into China. Not only has there been the Taikoo sugar refinery at Hongkong, but there has been a very considerable trade in Java sugar imported into China after having been refined in bond in the Japanese sugar refineries. These refineries during part of the year are busy on the refining of Formosan sugar for domestic Japanese consumption. At other times they have been handling sugars for the China trade.

About a year ago, greatly increased tariffs were placed upon the import of sugar into China, the amount of duty levied depending upon the degree of purity, polarization, and also on the form. For sugars of relatively low purity the duties are nominal, but for high quality products, such as white cube sugar, the duty is about Mex. $10 per picul. This has led to a shifting of refining activity, the Taikoo refinery now making refined sugar at Shanghai to avoid the high import duty from Hongkong.

The increase in sugar duty has naturally turned the attention of agriculturists in South China to the possibility of increasing domestic sugar cane production and sugar manufacture. The conditions for the growth of sugar cane in Kwangtung province and elsewhere in the coastal regions of South China are quite favorable. Both the very thin canes, perhaps one to two cm. in diameter, for milling and manufacture of muscovado sugar, and the much larger diameter chewing canes are produced. Most of the chewing canes are green colored and though smaller, they remind one something of the Pounda canes of India. In Hainan, however, in August we saw chewing canes of a deep red color, three or more cm. in diameter, reminding one of the Negros Purple cane.

In addition to local consumption in South China as a chewing cane, a good deal of sugar cane is wrapped in long matting parcels and exported from the coastal region somewhere south of Shanghai to Central and North China for chewing purposes, and during the months of February and March we see considerable quantities for sale on the streets even as far north as in Peking, of chewing cane, green colored, three cm. or more in diameter.

Very extravagant proposals have been made by interested parties in Kwangtung for the establishment of large sugar mills under government auspices for the production of white sugar. In connection with the possibility of developing this type of sugar production the writer was requested during the summer of 1932, to give an opinion upon the agricultural conditions for cane production in the province. So it was that an opportunity was provided for extensive travel in Kwangtung province and observation of agricultural conditions as a whole. Unfortunately, however, at that season, the sugar cane was not mature and no milling could be observed. We found sugar cane growing in widely scattered regions, but in no case did we see in one locality sufficient acreages to supply even a small modern sugar mill. Cane is grown for the most part on small terraced fields, the lower slopes of hills (Fig. 1) or even in association with crops on the lowlands (Fig. 2).

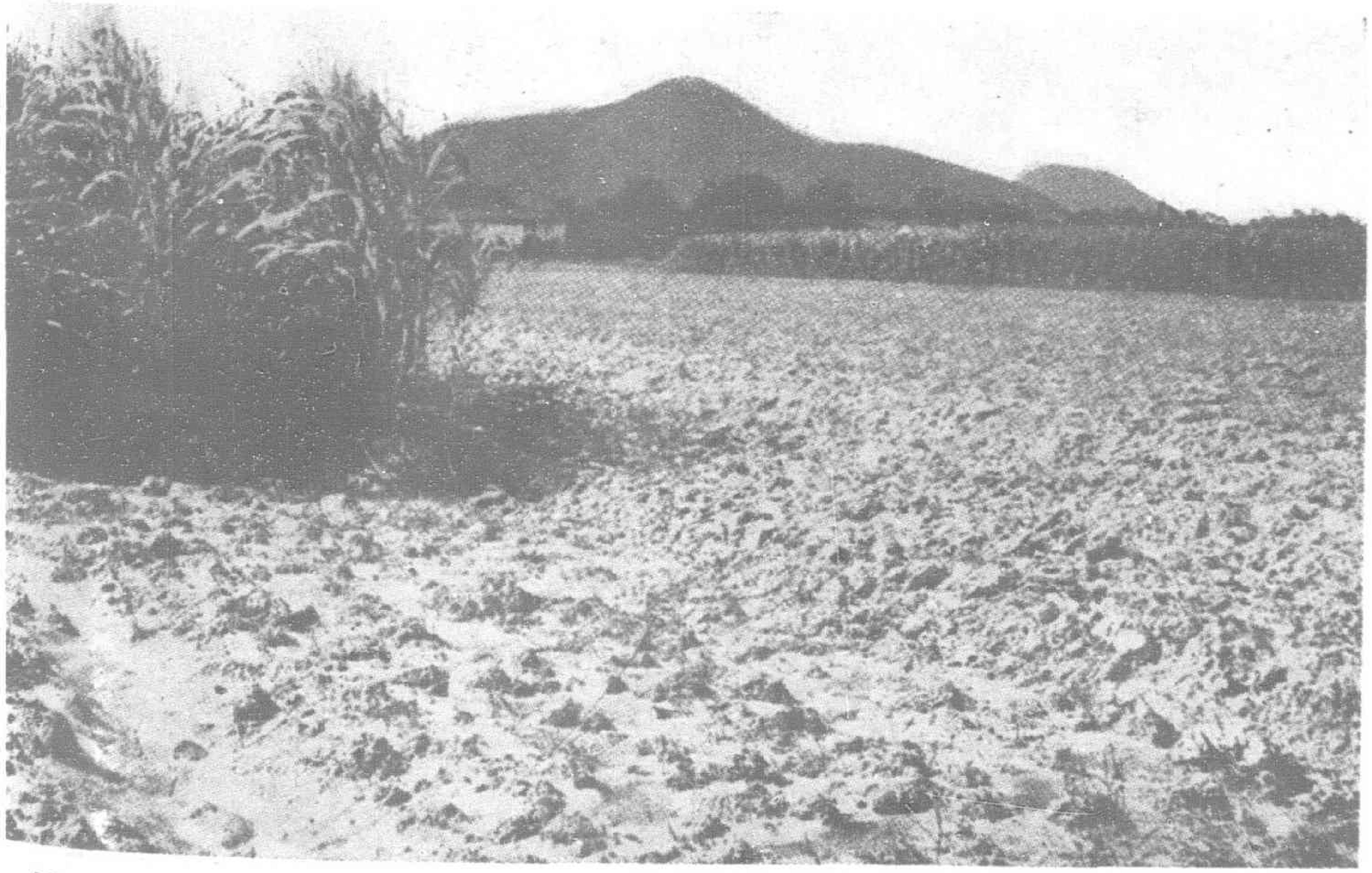


Fig. 2.—Sugar Cane Fields on the Alluvial Silt Loam Soil in the Tamshui Valley. The Cane when picture was taken was young but of good height

There had been developed a large production of sugar cane and manufacture of muscovado sugar in the southern portion of the Luichou Peninsula, where on an area of relatively rich red clay loams sugar cane and other upland crops grow very well. When we visited the Peninsula county of Chumen, however, we found that the sugar industry had almost disappeared. Out of a population which twenty-five years ago amounted to about 300,000 people, it was reported by the magistrate that bandits had killed or driven away about 190,000 persons. The consequence has been that where there were productive fields of sugar cane, there is now *parang*, or second growth forest, inhabited by a band of about one thousand bandits who completely terrorize the countryside. Most of the old stone sugar mills which used rollers similar to those seen scattered about Luzon are now in ruins (Fig. 3) and there are only desolate ruins marking the sites of the villages where these farmers once lived.

It is difficult in China to get satisfactory figures as to the amounts of cane and muscovado sugar produced at the present time or previously.

**Sugar News*

We were informed by the magistrate that Chumen county (hsien) prior to the establishment of the Republic had produced annually from Mex. $2,000,000 to $3,000,000 of sugar which was exported to Hongkong. This figure seems extraordinarily large. However, there is no doubt that, as the ruins of sugar mills testify, a few decades ago there was a large production of sugar. At the present time there is practically no sugar produced.

The muscovado sugar which we found in the markets in different places in the province was noted to be very variable in quantity. Most of it was very poor in flavor and far from being free from dirt. The best in quality was found north-west of Shiuchou, 200 km. north from the coast at Hongkong, where it was being transported and sold in large earthenware jars (Fig. 4). Each of these jars contained from 4/10 to 5/10 of a picul, valued at 19 cents per chin (catty), (about 26 cents HK Cy. per kilo, or at present exchange, 6 cents gold per kilo).

The result of our field studies was emphasis upon the need for a provincial sugar experiment station to develop better varieties of cane and to locally provide suitable methods of milling. Emphasis was placed upon the foolishness of expecting to successfully establish a large sugar mill without first developing adequate areas of cane. It is said that some time ago at Swatow a sugar mill was built by foreign interests but it has stood idle for years because it was unable to make a success of sugar milling on account of this very lack of an adequate supply of cane within an economic radius.

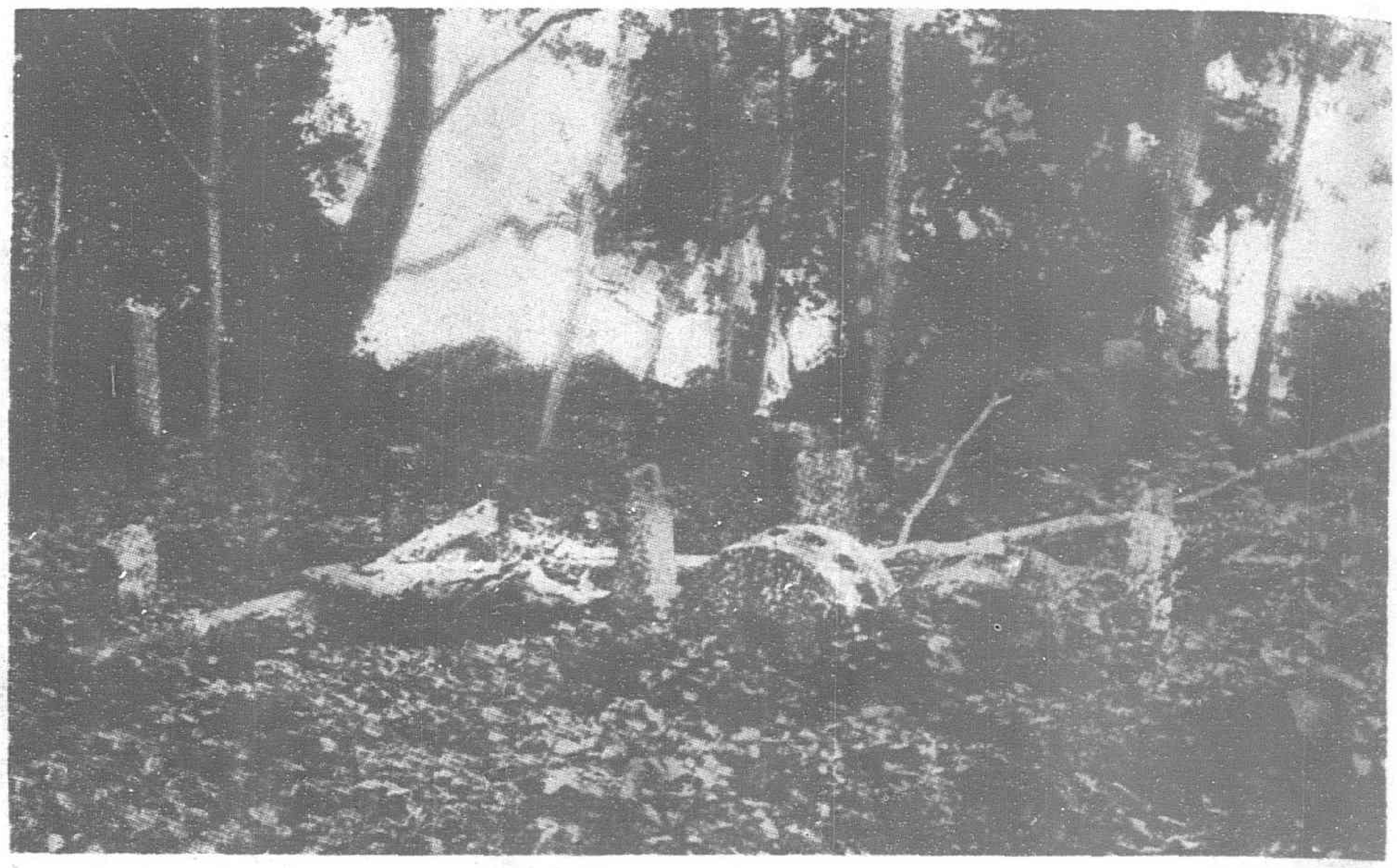


Fig. 3.—Ruins of a Stone Roller Sugar Cane Mill, near Chumen, Luichou Peninsula, South-western Kwangtung. This district a few decades ago was an Extensive Producer of Muscovado Sugar. The Rollers are the same type as are seen in the Philippines

About the only official information available at the present time for production of agricultural crops in China is that given in the *Statistical Monthly*.* In the combined issue for the months of January and February, 1932 (pp. 53-55), we find figures county (hsien) by county, for area of cane and amount of muscovado sugar produced annually. According to this publication, sugar cane production is limited to the two provinces of Kwantung and Fukien, that is, the region around Pakhoi, Canton, Swatow, Amoy and Foochow, as well as in the island of Hainan, or broadly speaking, the South China coastal region, between French Indo-China and Formosa. Kwangsi province west of Kwangtung also probably produces cane and sugar, but no figures are available.

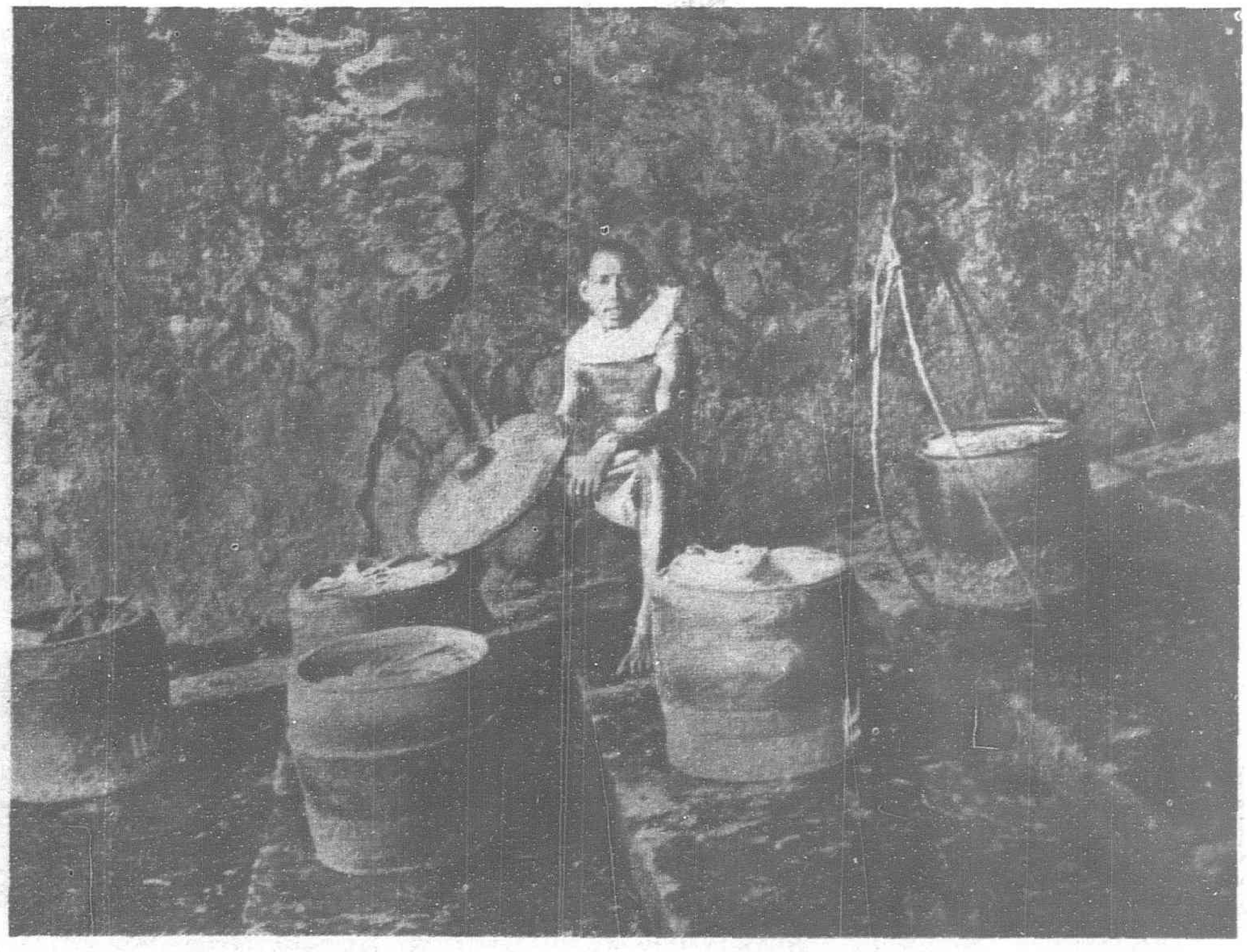


Fig. 4.—Muscovado Sugar on the way to Market. The small Thin Oblong Cakes of Dark Brown Sugar are packed in these earthenware jars containing about a Half Picul of Sugar

Sugar cane production is not limited to coastal regions but is rather extensive in some of the alluvial river valleys far in the interior, such as Shiuchou, over 200 km. north of Hongkong, Fig. 4. As a whole there is probably a greater amount of sugar production near the coast. According to this authority the total area planted to cane and the yields are as follows :

Province	*Area Ha.*	*Yield Muscovado Piculs*	*Per Ha. piculs*
Fukien	11,062	4,125,540	373
Kwangtung	42,000	12,220,040	291

This gives a yield of about 291 piculs per hectare for Kwangtung and 373 piculs per hectare for Fukien province. Though these figures show yields undoubtedly much too high, particularly when a considerable proportion of cane is sold for chewing, yet allowing for all the divergencies in size in local land measure and differences in local weights these figures are probably as good as can be expected.

The agriculture of Southern China is primarily based on rice in the lowlands, with relatively small terraced fields of upland crops where the land cannot be irrigated for rice. And with the present production of rice and other staple crops inadequate for the needs of the province, there cannot be expected any great increase of area of sugar cane production, except in those localities, as Chumen county, where security is at present unsatisfactory. The increases in production can only reasonably be expected by an improvement of sugar cane agronomy : better varieties, increased fertilization, adequate disease control. It has also been suggested that improved animal power mills, and better boiling practices would result in a muscovado sugar of considerably better quality.

If the authorities be insistent upon producing more white sugar, and if there be a sufficiently high tariff wall, the only practicable method would be to refine muscovado sugar. But with the surfeit of sugar in the world it is to be hoped that the consumers will not be thus penalized for the fostering of local sugar production, particularly if it be at the expense of the area of rice and other grain crops.

In conclusion, we find :

1.—Sugar cane production in China for chewing and making muscovado sugar is limited to the coastal provinces.

(Continued on page 282)

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*Published by the Directorate of Statistics, Directorate-general Budgets, accounts and Statistics, National Government of China, Nanking.

Tokyo Station and Railway Administration Offices, Japanese Government Railways

The Japanese Government Railways

Working and Results

By B. REED in "Eastern Engineering and Commerce"

Almost alone among the State and National lines throughout the world the Japanese railways can show a profit on their working after all interest charges and subsidies have been paid. By fulfilling one of the first principles of good business—that of keeping the Railway Budget entirely separate from that of the State (since 1909)—a large degree of freedom has been permitted the executive officers, and they have turned it to good account.

The first project dates back to 1869, when the Government proposed a trunk line from Tokyo to Kobe, but as the Treasury was in no position to cover the outlay, the matter was put into the hands of an Englishman, Horatio Nelson Lay, who floated a Japanese loan for a million sterling on the London market. Construction was commenced in 1870, and the section from Tokyo to Yokohama completed in 1872, while at the other end the lines in the populous district round Kobe and Osaka were opened in 1877.

TABLE I.

		1931-32	*1930-31*	*1929-30*
Capital	Yen	3,462,322,623	3,382,820,115	3,285,165,893
Capital, per km. of Route Line	,,	232,214	233,502	232,639
Working Revenue	,,	433,540,288	458,140,252	518,016,452
Working Expenses	,,	266,634,480	284,824,020	304,142,749
Operating Expenses to Receipts	Per cent.	61.5	62.1	58.7
Profit on Operating	Yen	166,905,808	173,316,232	213,873,703
Interest and Other Charges	,,	98,454,047	97,728,771	94,884,195
Net Profit	,,	68,451,761	75,587,461	118,989,508

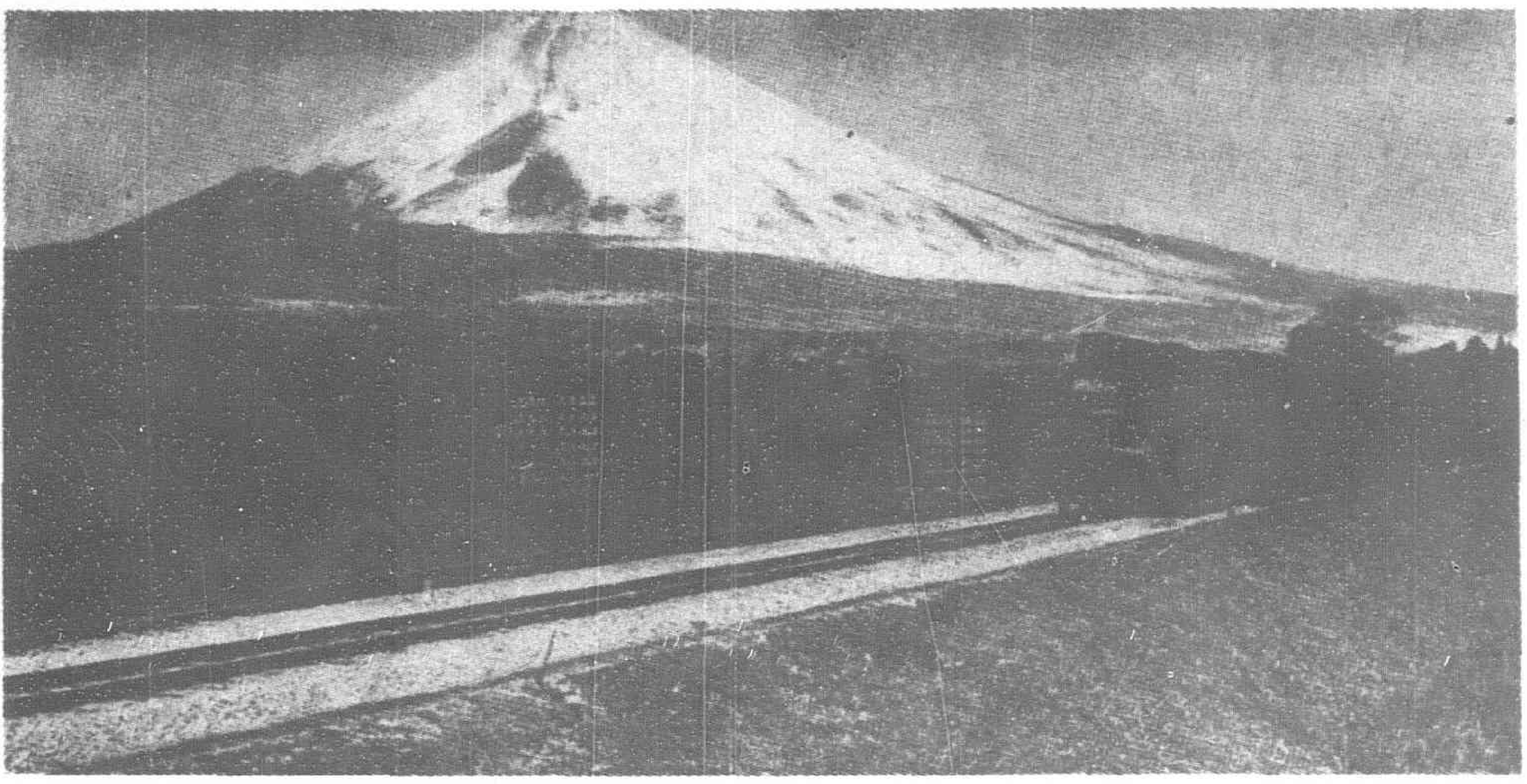
Now known as the "Tokaido" route, this 372 mile main line was not finished throughout until 1889, but in the meantime other Government lines had been constructed on the main island and in Hokkaido. Greater enterprise was, however, shown at this period by private interests, who were responsible for the construction of 1,150 miles of line between 1881 and 1891. Practically all of these lines have now been gathered into the net of the State.

At the present time the Government lines comprise some 9,250 route miles of 3-ft. 6-in. gauge track, the total length reduced to single track and including sidings being 15,200 miles. Invested in this line and its equipment is capital to the extent of Y.3,462,322,623, much of which, in addition to the permanent way, is visible in the form of 2,740 stations, including the fine Tokyo terminus in the photograph, 4,016 locomotives, 9,553 passenger cars, 1,219 electric cars, 65,138 goods wagons, and over twenty large workshops.

The organization of the system is decentralized into six regions, each of which is a complete unit. Only on matters of national importance does a regional chief obtain a ruling from the Central Administration, which is located at Tokyo, and governed directly by the Minister of Railways,. Each section looks after its own operating, maintenance, and any new construction which may be allotted to it. The six regions are Tokyo, Nagoya, Osaka, Moji, Sendai, and Sapporo, and to each are attached three or four workshops for the rebuilding and repairing of the divisional stock. New construction is also undertaken, but most of the steam and electric locomotives are built by Japanese firms, such as the Kisha Seizo K.K. of Osaka.

Although naturally suffering from the world-wide depression, the motto of the Administration seems to have been, "We know business is bad ; let sleeping dogs lie." As a result of the strenuous efforts made to cope with road competition and reduced spending power, the last balance sheet, shows a net profit, after meeting all charges, of Y.68,451,761, or 1.98 per cent. On operating alone the profit is 4.8 per cent, but there is still a light increase in the operating ratio over that of 1929. The capital and operating figures over the last three years are best given in tabular form in Table I.

Compared with 1930-31 the 5.3 per cent reduction of receipts for the last annual period is partly counterbalanced by a drop of 6.5 per cent in the operating charges, but interest charges are somewhat higher. By scrapping a number of obsolete locomotives, carriages and wagons, and using the remainder more intensively, rolling stock and maintenance expenses were reduced by 9.75 per cent, and traffic and transportation charges by 6 per cent. But, keeping to a progressive policy wherever possible, the number of electric locomotives was in 1931-32 increased from 97 to 119, and the electric cars from 1,128 to 1,219, while a number of Diesel locomotives were also introduced.



Tokyo-Kobe Express near Base of Mt. Fuji—Pacific Locomotive, Japanese Government Railways

TABLE II.

	1931-32	*1930-31*	*1929-30*
Number of Passengers Carried ..	787,222,491	824,152,598	862,939,432
Passenger earnings .. Yen	208,876,884	222,036,230	243,240,990
Coaching Receipts .. ,,	239,971,712	255,086,230	285,337,862
Passenger Train Mileage .. Miles	83,024,503	80,007,500	74,525,762
Average Passenger Journey ,,	15.1	14.9	15.7
Volume of Goods Handled .. Met. Tons	60,590,746	64,087,099	77,224,824
Goods Earnings .. .. Yen	173,738,361	181,859,221	215,658,329
Goods Train Mileage .. Miles	31,707,728	32,528,851	35,662,804
Average Haul .. .. ,,	108.75	105.6	101.0

The amount of coal consumed fell by 6.5 per cent on the 1930-31 figure to 2,710,000 tons, but the fuel bill dropped by 10 per cent to Y.24,075,261. Locomotive mileage went up by 48,000 miles, barely one quarter per cent, while the coal consumption per locomotive mile dropped from 54.5 lbs. to 50.3 lbs.

The manner in which the slump from 1929-30 to 1930-31 was arrested in the last fiscal year—to March 31, 1932—is worthy of note, especially on the freight side. The drop of roughly 13 million tons between the first two years was succeeded by a further drop of less than four million tons, and even this is slightly offset by the longer haul per ton, viz., 108.7 miles against 105.6 in the previous year. The freight receipts showed a reduction of Y.8,120,860, or only 4.3 per cent.

Passenger figures showed a similar decrease. From 824,152,598 carried in 1930-31, the number fell to 787,222,491, but the length of each passenger's journey—a figure which fell steadily from 1919 to 1931—rose from 14.9 to 15.1 miles, while the receipts came down by Y.13,159,346, or 6 per cent. For the last three years the traffic figures are as in Table II.

By a reduction in the personnel from 204,564 to 198,678, the wage-bill has been decreased by 1.5 per cent to Y.134,296,222. This is not a large amount, and actually the wage-bill forms a greater proportion of the total expenditure than in previous years. In 1930-31 the percentage was 48, but last year it rose to 50.3 per cent, which is still a good way below the figures of many railways.

Accelerations have been effected on both main and branch lines, and the principal expresses between Tokyo, Kobe, and Shimonoseki have been quickened up to an average speed of over 40 m.p.h. including stops. All except the "Fuji Express" carry third class passengers, and the "Sakura Express," from Tokyo to Shimonoseki, is probably unique among the world's crack trains in that it carries third class passengers only. The fastest train between Tokyo and Kobe is the "Swallow Limited" (Tsubame) which covers the 372 miles in an overall time of nine hours.

Third class sleeping-cars were inaugurated on the Tokaido line in 1931, two services each way per night being available between Tokyo and Kobe, in addition to five each way with first class sleepers. Over the system as a whole there are thirty-two nightly sleeping-car services and thirty dining-car services, ten of the latter supplying European fare in addition to the usual Japanese meals. On the Tokaido route additional observation cars have been introduced on the day services, while on some of the branch lines second class cars have been withdrawn. On the main lines, however, this class is popular, and the accommodation is being increased at the expense of first class cars, which at present do not enjoy much patronage.

Electric working is in operation out of Tokyo, but the Tokaido trains are soon taken over by steam locomotives. Each locomotive runs right through to Nagoya, special tenders having been built to eliminate the necessity of taking in water *en route*.

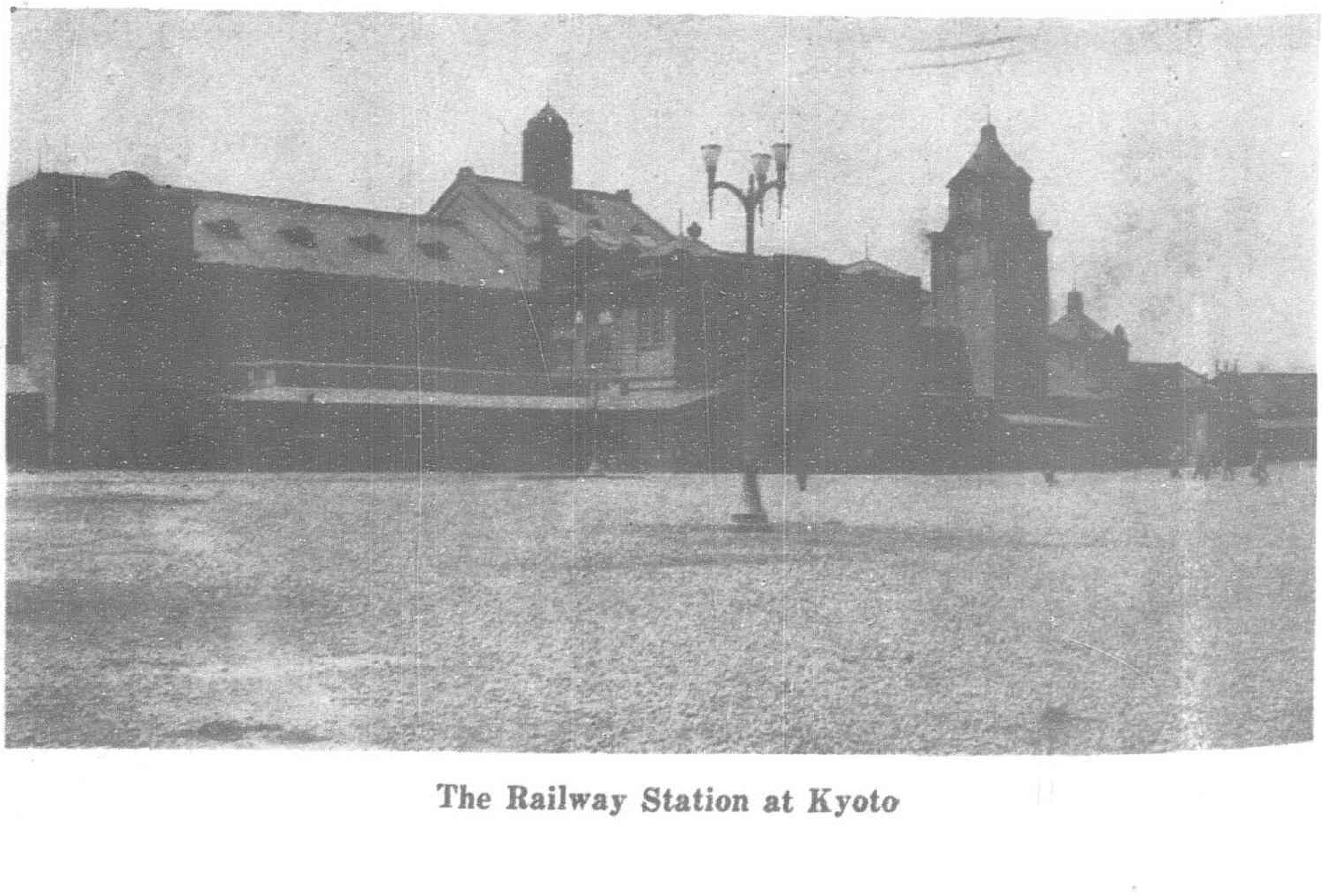
In addition to acceleration, more efficient working of the goods traffic has been assisted by the construction of a number of 25 ton box cars suitable for operation in fast trains, while the fitting of air brakes to all the stock is proceeding apace. The greatest accelerations in the goods traffic have been made on the inter-island services. A 20 per cent cut in the times taken for the transport of perishables from Hokkaido to Tokyo and Kobe has been effected, and one or two days in the journey from Tokyo to Manchuria and Chosen.

All the principal express trains are hauled by "Pacific" locomotives, of which there were no less than 428 in service in 1931, with another series under construction. The latest engines scale 66 tons in working order, plus a 44 ton tender, and the class as a whole is distributed over all of the six regions. Even larger "Mikado" are found at the head of the heaviest goods trains, for they have a weight of 78 tons, plus a 49 ton tender, but in no case does the axle load exceed 15 tons. There are still a number of Mallet articulated engines at work, but they are confined to the Tokyo division, and are gradually being withdrawn from service.

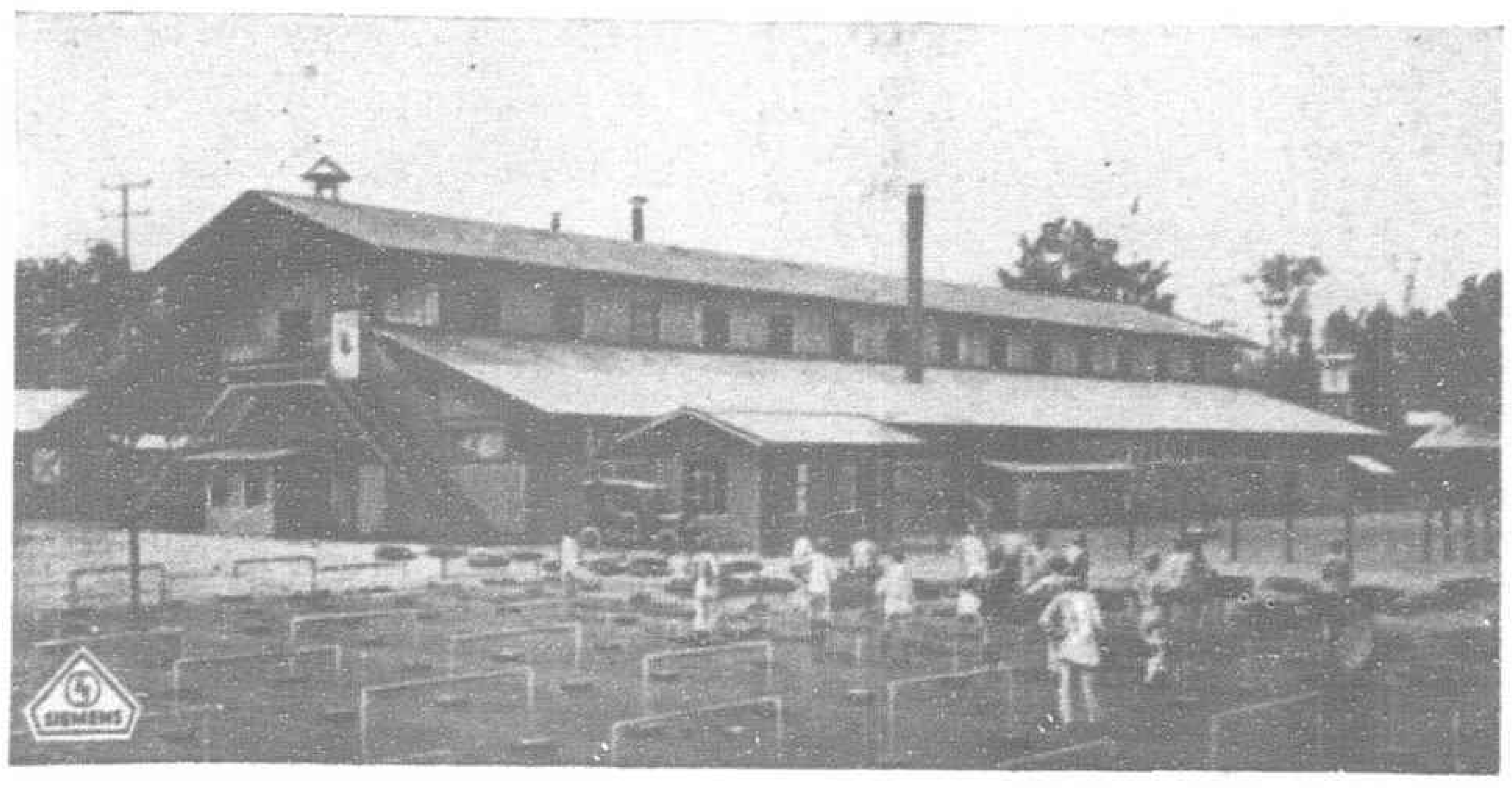
Twenty-two electric locomotives were built in 1931-32, and of the present total of 119, all but 17 in the Nagoya division are located round Tokyo: The Tokyo division includes the Usui Toge incline, which is part of the shortest cut over the main island via Omiya. The five miles of 1 in 15 are worked on the Abt rack system by electric locomotives, which in the short journey from Yokokawa to Karuizawa, a bare seven miles, pass through twenty-six tunnels and over eighteen bridges. This line was constructed in 1893, and was electrified in 1912. Of the twenty-eight electric rack locomotives now working the traffic, the last fourteen were constructed at the Omiya works of the Tokyo region, which establishment also looks after the maintenance of the stock on the extensive electrified suburban system round Tokyo and Yokohama.

Included in the passenger stock list are twenty vehicles for the exclusive use of the Royal Household. No less than 670

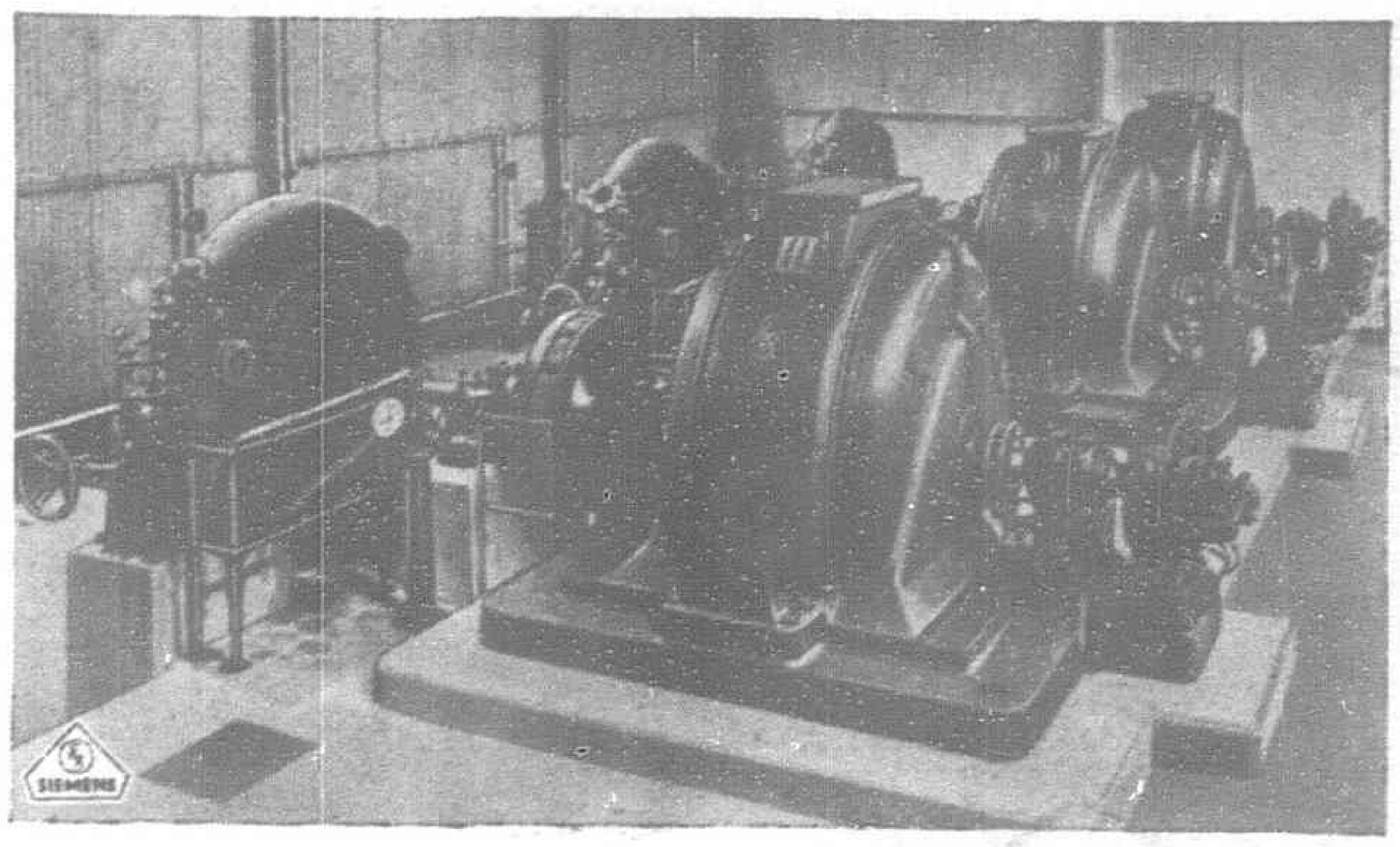
(Continued on page 282)



The Railway Station at Kyoto



The Malabar Tea Factory in Java in which 4 Electric Air Driers of 160 kw each and 2 of 84 kw each are at work



Central Power Station at Malabar showing Three-phase Generators of 850 kva

Tea Drying by Electricity

By P. GROTH

HEATING by means of electric current has become an important field of electrical engineering, which offers equal advantages to the supply undertaking and the consumer.

If an electric generating station is limited to the supply of current to motors and for lighting, the load peak will usually occur in the evening owing to the current consumption for house and street lighting. The full capacity of the plant is thus only used for a short period of each day. A considerable improvement of the working economy of the station will be ensured, however, if it is possible to secure a load to level up the valleys, i.e. to fill out the periods of low load. Without exception, therefore, Supply Companies grant special tariffs to consumers who bind themselves to take current regularly when the load on the system is low. The effect of the full utilization of the machines is particularly favorable in hydro-electric stations, since the running costs are no higher than if the station is only partially loaded. Electric heating is a very suitable means of balancing out the load.

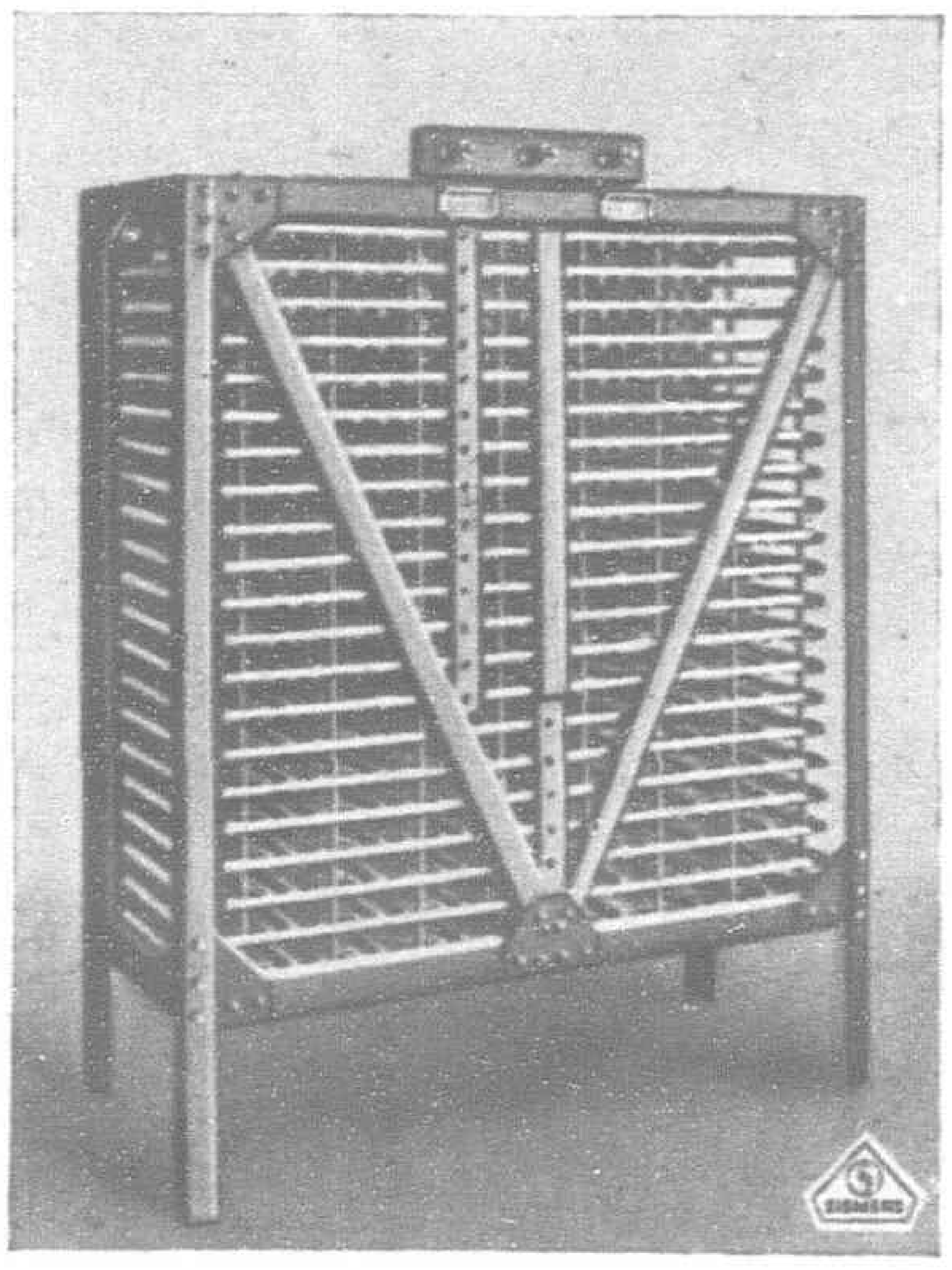
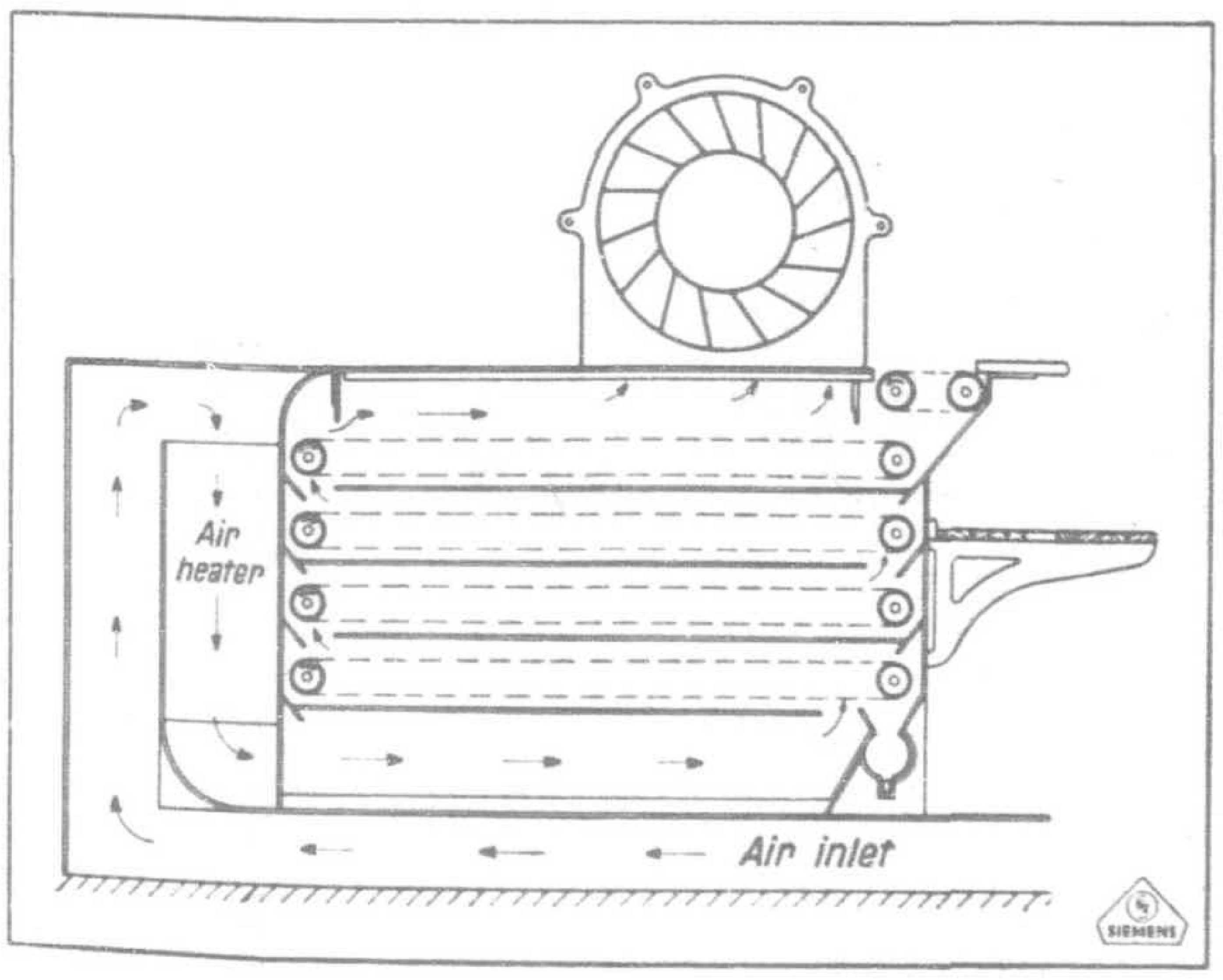


Fig. 1.—Electric Air Heater of 168 Elements in groups of 56 each

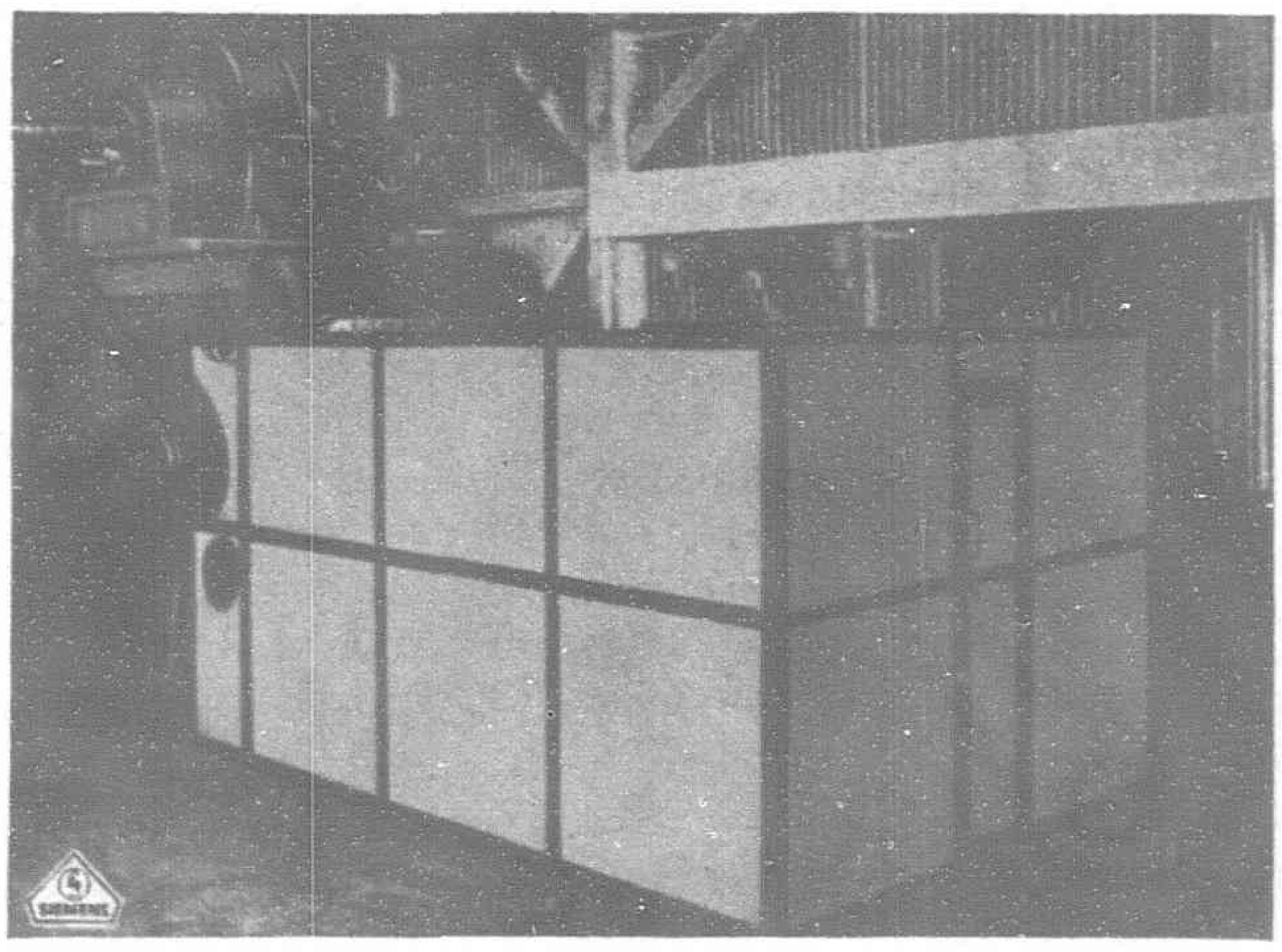
The electric drying of tea combines the advantages of cleanliness and reliability in operation with a saving in the cost of fuel and attendance.

Experience of existing installations shows that the current consumption per pound of dry tea is less than 1 kwh. This assumes of course that the electric heating equipment is suitably incorporated in the drier and that the radiation losses are not excessive. The heating equipment can be adapted to fit the available working space and the type of drier, since it consists of a number of individual heating elements of identical form. The heating elements consist of a fire brick core with grooves which carry a heating wire of a special nickel chromium alloy. A number of these elements is combined into a group, the ends of which are connected to the current supply. The heating elements are carried in wrought-iron racks. Fig. 1 shows an electric air-heater consisting of 168 elements, in groups of 56 each. The heating equipment is usually placed immediately in front of the drier and enclosed in a heat-insulating housing to prevent radiation losses. At the same time, the housing serves to conduct the air in a suitable manner through the heating elements.

Fig. 2 illustrates in section the air-heater in conjunction with a drier. The air is drawn through the heater by a suction fan and enters the drier at a temperature of about 212-230° F, escaping again at a temperature of about 113-132° F. The duration of the heating period depends on the moisture content of the leaves, which is influenced by weather conditions and the height of the plantation above sea level. It is frequently necessary to divide the driers into sections. In this case the greater part of the water contained in the damp fermented leaves is expelled in the first section, with the result that the weight of the leaves is now about half of what it was originally. In the course of the second drying process, which follows, the weight of the intermediate product is reduced by about a further 20 per cent. These figures are only



Showing section of Air Heater in conjunction with drier

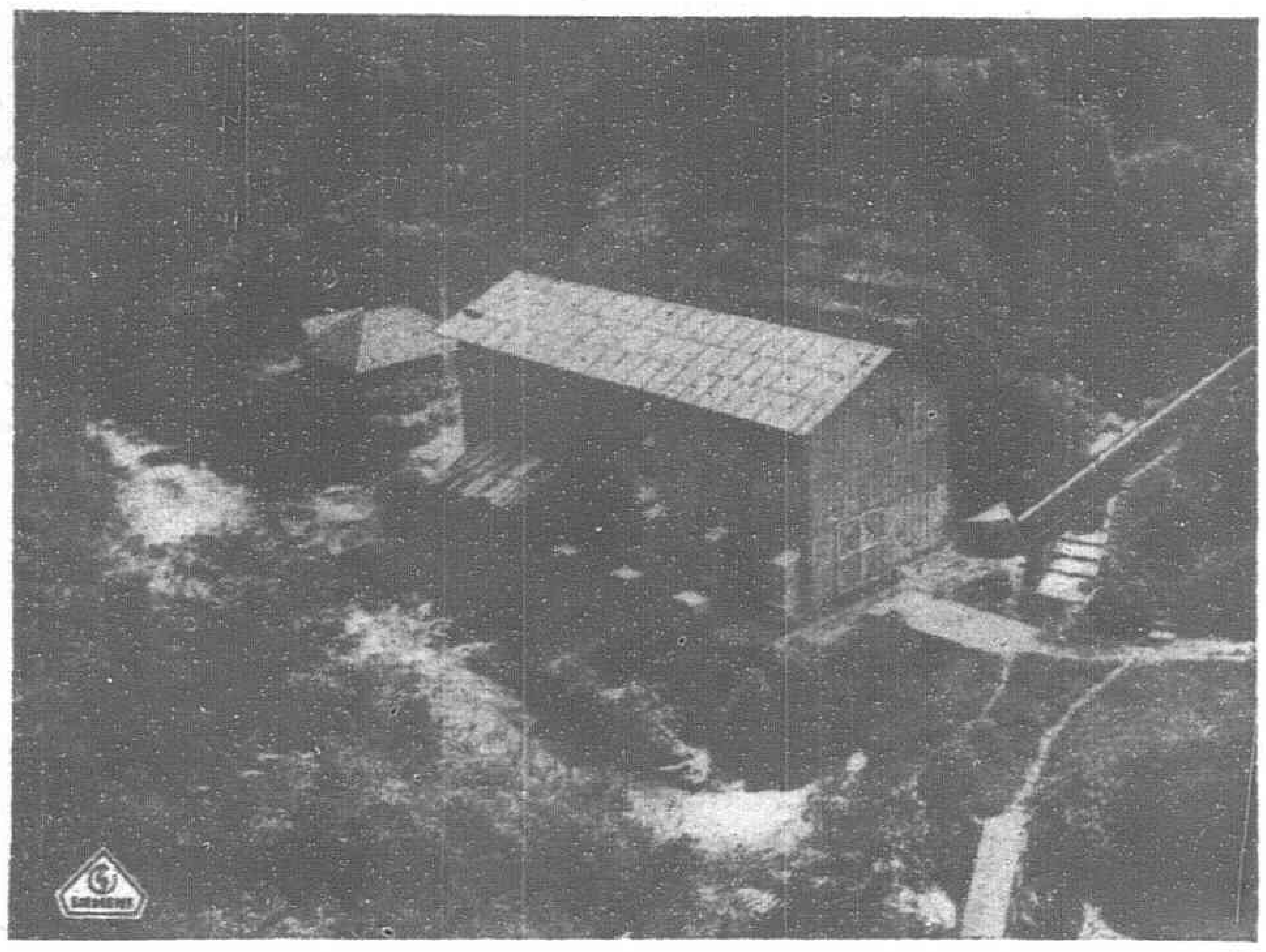


Complete plant with Tea Drier surmounted by motor-driven Fan visible in background to be regarded as approximate, since they are affected by the moisture content of the leaves.

As already stated, the air heater is closed in with heat insulating material, preferably asbestos plates. Fig. 3 shows a complete plant, the tea-drier surmounted by the motor-driven fan being visible in the background.

The drying process is controlled by suitably grouping the heating elements by means of change-over switches and by varying the speed of the fan. The switchgear for the fan and the heating elements are interlocked, so as to prevent the latter being connected to the supply before the fan is running and a current of air passing through the air-heater. Control is exerted in fine steps and can be adjusted exactly to the quality of the tea.

The number and capacity of the air-heaters depends on the daily output of the factory and the number of hours available for drying. The general rule stated above, viz. 1 kwh per pound of tea, will serve as a guide in determining the size required. On the basis of a cheap night tariff a number of tea factories have already adopted the electric system of drying.



Hydro-Electric Station containing three 3-phase Alternators of 850 kva each

Fig. 5 illustrates the Malabar tea factory in Java, in which 4 electric air driers of 160 kw each and 2 of 80 kw each are at work, so that the total consumption for heating alone amounts to 800 kw. Current is generated in a hydro-electric station (Fig. 4), containing 3 three-phase alternators of 850 kva each. One of the machines (Fig. 6) is thus fully loaded when the tea-driers in Malabar are at work. Since arrangements are made to dry the tea at times when the alternator is not required for power and lighting purposes, the tariff granted by the Supply Company is extremely low with the result that the drying process is rendered highly economical. The electrical equipment was supplied by Siemens-Schuckert, Berlin.

Japan's Coal Industry

By SHOGO TAJIRI, M.P. For The Japan Times

According to investigations conducted by the Department of Commerce and Industry between 1929-31, and which have recently been made public, the coal resources in Japan total 16,600,009,000 tons. Comparing this with the estimate made as a result of investigations conducted in 1911, which placed the total resources at only 8,800,000,000 tons, it will be noted that the present estimates about approximately double those made 18 years ago.

Coal resources are analyzed in three divisions: existing, estimated and anticipated. The volume of existing and estimated coal resources in Japan is placed at 6,500,000,000 tons. Consequently, if Japan mines 300,000,000 tons annually, the present existing and estimated resources will last two hundred years.

The demand as well as output of Japanese coal has continued to increase year by year until 1929, when the high-water mark was reached. Since then there has been a decline both in demand and output. Up to 1927 Japan was an exporter of coal, but since then she has registered an excess of imports of coal.

The demand, output and export and import of coal from 1912 to 1931 follow: (in 1,000 tons)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
1912	19,640	308			3,468		16,480
1916	22,920	556			3,017		20,441
1921	26,221	790			2,407		24,604
1926	31,426	2,044	2,201	35,672	2,611	1,022	32,039
1927	33,530	2,703	1,022	37,256	2,190	1,296	33,769
1928	33,860	2,778	1,296	37,935	2,184	1,944	33,805
1929	34,257	3,254	1,944	39,456	2,043	2,289	35,123
1930	31,376	2,692	2,289	36,358	2,130	2,460	31,767
1931	27,987	2,692	2,460	33,140	1,540	2,206	29,393

(A)—Production
(B)—Imports
(C)—Stock available at the end of the previous year
(D)—Total
(E)—Exports
(F)—Stock at the end of the year
(G)—Actual consumption

Affected by Depression

Like all other industries, coal mining has been badly affected by the world-wide depression, and there has been a noticeable inactivity in this field of enterprise especially since 1929, for while 1929 was the highwater mark in the demand and output of coal in Japan, an abrupt drop was registered the following year principally as a result of the marked depreciation in the value of silver. In 1930, the price of coal dropped abruptly due to the lifting of the embargo on gold and the government's retrenchment policy.

A similar situation also prevailed through 1931. In 1932, despite the reimposition of the gold embargo, the price of coal remained low because of the mild winter and the dumping of Fushun coal.

The coal on stock at the end of January last year was 2,270,000 tons, but at the end of July the supply was in excess of 2,700,000 which set a new record for volume of coal in stock.

The standard price of coal and the average price paid by the Imperial Government Railways, for the past eight years, follows:

	(A)	(B)
1926	Y.16,067	Y.12,607
1927	16,683	13,858
1928	17,100	13,942
1929	16,983	13,442
1930	15,200	11,570
June 1931	12,800	10,800
August 1931	12,700	10,700

	(C)	(D)	(E)
1929	Y.10,765	Y.12,404	Y.8,490
1930	10,048	11,392	8,021
1931	8,530	9,468	6,794

(A) Lump coal. (B) Dust coal. (C) Kyushu coal. (D) Hokkaido coal. (E) Tokiwa coal.

A. The depressed condition of world finance.
B. The development of substitute fuel material.
C. The advancement in methods of eliminating waste of coal.

The over-supply of coal is due to:

A. The enormous demand for coal during the World War, which caused prices to increase tremendously and enabled the working of new pits as well as the installation of better equipment in existing mines.

B. The fact that despite the decrease in demand following the World War, the limitation of production and the curtailment of hours of operation of miners was extremely difficult due to special reasons. Forcing such measures would have meant the closing up, or abandoning of mines in most cases.

China's Machinery Imports*

Remarkable Advance in Recent Years

It is generally recognized that the industrial development of a country is indicated by the degree of mechanical application to its industries. China is in the main an agricultural country, and her industries have long been of the handicraft type, which does not call for any complicated machinery. With the gradual introduction of the system of mass production, however, machinery of many different descriptions was imported, but the making of machinery has not kept pace with other manufacturing enterprises in China. Only in quite recent years have machines of the simpler type been made by Chinese. Their output is far from sufficient to meet the demand, and moreover, the quality not so good as that of imported manufactures. Consequently, practically all the machinery employed in China's new industries is imported, and the trend of industrial development is almost identical with machinery imports.

According to Customs statistics, machinery began to be imported into China in fairly large quantities in 1887. The total value of imports in that year was Hk. Tls. 398,407. The volume increased steadily until 1921, when the total was Hk. Tls. 57,327,643. Since then there has been a decrease, the total for 1931 being Hk. Tls. 44,875,346.

The introduction of modern industry in China dates from about 1880, but the quantity of machinery imported was insignificant, and as Chinese factories in those days were mostly Government enterprises, the machinery imported was principally of the type used in heavy industries like shipyards, machine-shops, and arsenals. Following the establishment of the New Textile Bureau in 1890, industrial development in China began to move more briskly and from 1891 to 1905 the value of machinery imports increased eightfold. After 1905 more factories were established in China by foreign interests, while the Chinese Government also did much to promote the development of Chinese factories of modern type, so that the number of machine-equipped factories greatly increased. In 1914 there were more than 300 registered factories in China, according to statistics compiled by the Ministry of Agriculture and Commerce.

The economic and industrial changes brought about by the World War gave a new impetus to Chinese industries. More factories came into existence, and the demand for imported machinery increased tremendously. From that time, political disturbances in China greatly retarded industrial development, so that a corresponding decline was shown in imports of machinery until 1929, when Customs figures rose from a mere Hk. Tls. 3,641,366 in the preceding year, to over Hk. Tls. 40,000,000 again.

The increase in the value of machinery imports during the last few years seems to indicate that China has been entering upon a new era of industrial prosperity, but the relative prices of gold and silver have to be considered. China uses a silver currency, while the price of imported machinery is paid in gold. Fluctuations in the value of silver always have a misleading effect in analyzing Chinese Customs figures. When the price of silver has depreciated, an increase is shown in import values though the quantity of goods actually imported may not increase at all. The figures for machinery imports during 1921 and 1922 indicated a real industrial boom in China, because silver had appreciated in those years, the price being even higher than in pre-war days. In 1913, the average rate of exchange between the Haikwan Tael and American dollar was Hk. Tl. 1=G.$0.73 ; in 1921 and 1922 the rates were Hk. Tl. 1=G.$0.76 and Hk. Tl. 1=G.$0.83 respectively. The Customs figures for 1929 and 1930 tell a different tale, as the rates of exchange during these two years were about Hk. Tl. 1=$0.64 gold and Hk. Tl. 1=$0.46 gold. Consequently, though the Customs figures appear to show that the amount of machinery imported during these years was nearly as much as that imported in 1921 and 1922, in reality the total was much less, the apparent increase shown by the Customs figures being due entirely to depreciation in the value of silver.

Descriptions of Machinery Imported

Machinery imported into China is usually divided into groups as follows: (1) Agricultural machinery, (2) electrical machinery for power-generating and transmission, (3) prime-movers, (4) pumps, (5) brewing and refining machinery, (6) cigarette-making machinery, (7) textile machinery, (8) printing machinery, (9) machine-tools, and (10) other descriptions, which include machines used in chemical industries.

Agricultural Machinery.—The heading "Agricultural machinery" includes, and in fact consists chiefly of, machinery used in flour-mills, mechanical appliances for actual agricultural uses being rarely imported. Flour-milling was a very prosperous enterprise during and immediately after the World War, and the import of "agricultural machinery" reached its highest mark during those years. Since then, the milling industry has been on a downward trend, and imports of "agricultural machinery" have likewise decreased in volume. Owing to imports into Manchuria passing through Dairen, the Customs figures rose again, but were still far behind those recorded during the World War. As to mechanical farming appliances, though a few of these have been introduced into Manchuria under Japanese influence, practically none are used in other parts of China. The Kiangsu Provincial Farm Machinery Factory produces several descriptions of machinery and the quality is quite satisfactory, but owing to limited output and the farmers' conservative attitude toward new ideas and methods, the products of the factory are not widely used.

Printing Machinery.—Modern printing is of recent growth in China. From the end of the Tsing Dynasty to the beginning of the Republic, not much printing machinery was imported, and mostly consisted of lithographic presses. After 1917, however, machines of the offset, Miehle, and Centurette type began to come on the market, and owing to it speed, the offset press was especially popular. Recently Chinese manufacturers have begun to make a few of the simpler forms of printing machinery, but all the more complicated varieties, such as photo-engraving machines and Duplex presses, are still imported. Of the foreign printing machinery brought to China, Chinese are the largest buyers, though the best and most up-to-date plant is found in the establishments operated by foreign printers. For instance, in Shanghai the British and American Tobacco Co. owns the largest number of offset machines.

Textile Machinery.—Plant used in the textile industries, mostly in cotton-mills, constitutes the major part of machinery imported. Cotton weaving and spinning were at the peak of prosperity during and immediately after the World War, and the import of textile machinery was largest during that period. In 1923 more than Hk. Tls. 30,000,000 worth of such plant was imported, and although a decline has been shown, imports of textile machinery still take the lead both in quantity and value.

A considerable portion of this plant goes into the equipment of foreign mills in China. According to statistics published this year by the Chinese Cotton Mill Owners' Association, there are 84 Chinese cotton spinning and weaving factories, with 2,589,040 yarn spindles, 141,750 thread spindles and 20,599 looms, while there are 41 Japanese factories, with 1,757,248 yarn spindles, 246,140 thread spindles and 19,306 looms, and three British factories with 170,610 yarn spindles and 2,691 looms. The Chinese mills, though operating more yarn spindles, have fewer thread spindles and looms. Furthermore, nearly 80 per cent of the spindles in Chinese factories are many years old, while more than 50 per cent of those in Japanese mills are of the most up-to-date type, which explains why most Chinese mills produce only coarse yarn.

Markets for Imported Machinery

Shanghai and Dairen are the principal markets for imported machinery. Other ports, such as Tientsin, Hankow, Canton, Kiaochow, and Harbin, each import a considerable quantity of machinery annually, but the figures are comparatively insignificant, and very little is imported at places other than those mentioned. Dairen leads in the import of what is classified as "agricultural machinery," while Kowloon imports most of the brewing and refining machinery, but Shanghai is the principal importer of all other descriptions, because more than 50 per cent of the textile,

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milling, and tobacco factories in China are located in Shanghai, while most of the machinery which goes to factories in the interior is re-exported from this port, though this business is quite small, most of the machinery imported at Shanghai being for local factories. Many of the industrial establishments in Shanghai, however, are foreign owned, and absorb more than 50 per cent of the imported machinery for use in cotton textile, tanning, printing, and paper factories. Machinery for milling, silk textile, and match-making goes solely to Chinese factories.

Dairen, being the principal port in Manchuria, is second only to Shanghai as a center for machinery imports. Modern industries had shown a marked development in Manchuria during recent years before the Japanese invasion, and a corresponding increase was seen in the value of machinery imported into Dairen. Most of these industries, however, are controlled by Japanese interests, Chinese enterprises being usually older in type and smaller in scale. Owing to the great number of oil and flour mills in Manchuria, agricultural machinery is imported through Dairen in considerable quantities.

The port of Kiaochow handles a considerable quantity of textile machinery, owing to the establishment of six Japanese cotton mills in Tsingtao. Tsinan and other parts of Shantung also import their requirements through Kiaochow. Harbin, being an important flour-milling center, imports much agricultural machinery. Formerly Tientsin was a good market for machinery, but industries in that port have been on the decline during recent years, and many factories have closed down. Hankow took a considerable quantity of machinery before the great floods of 1931, as there were many cotton and flour mills in that Yangtze port, and industries such as cotton-ginning and packing, egg-products, and ice-making were flourishing. Since the disastrous floods, business has suffered considerable depression owing to the effects of that disaster and military activities in the vicinity.

Imports of Machinery by Countries

Most of the machinery imported into China come from Great Britain, the United States, Germany, Japan, Sweden, Belgium and Italy, imports from the first named four being particularly large. The following table shows the annual value in Hk. Tls. of machinery imported from these countries :—

	Great Britain	*U.S.A.*	*Japan*	*Germany.*
1919	2,080,128	5,129,574	3,631,238	—
1922	22,462,633	10,437,180	9,268,888	2,652,150
1923	10,424,129	4,449,348	6,425,348	3,216,491
1924	7,154,841	4,911,561	4,452,216	4,039,625
1925	5,103,647	2,843,344	2,888,210	2,622,690
1926	4,701,295	3,764,615	4,167,823	2,521,169
1927	5,919,014	3,013,189	5,061,410	1,992,096
1928	5,705,518	5,208,745	4,291,061	2,435,221
1929	10,064,431	5,716,870	6,524,681	4,165,216
1930	14,769,903	7,131,140	10,028,570	7,731,955

Prior to 1919 no machinery was imported from Germany owing to the effects of the World War, but recently, machinery imports from that country have increased considerably in volume. During the years before 1922 the United States and Japan occupied the most prominent position in the machinery import trade of China, but Great Britain has secured in the leading position again. After 1923 a general decline was shown in the volume of machinery imports until 1928, but the increase in the Customs figures for machinery imports since 1928 is due to depreciation in the value of silver, rather than increased volume, for Chinese industries have suffered from bad trade like those in European and American countries.

Japan, on account of her proximity to this country and the large number of Japanese factories in various Chinese ports, exports a very substantial amount of machinery into China. The low priced Japanese products are particularly popular in Chinese markets, while Great Britain and the United States maintain their position by the high quality of their machinery, and Germany secures her share of the business by good workmanship coupled with easier terms of purchase. From countries like Sweden, Belgium, and Italy, only a few varieties of light machinery are imported.

Extensions at Hongkong Electricity Station

(Continued from page 268)

infinitely variable speed change according to the steam demands. The boiler, constituting the latest unit, is on the same lines, with a 240 h.p. motor for the induced draught fan and an 83 h.p. motor for the forced draught fan, in both cases fitted with hydraulic couplings.

The latter is supplied by the Hydraulic Coupling and Engineering Co., Ltd., Isleworth, London, of which firm the inventor, Mr. Harold Sinclair, is Managing Director.

The general design is now more or less well-known, the arrangement consisting of a driving half or impeller mounted on the motor shaft and carrying a casing which encloses a driven half or runner, the latter being fixed to the fan or driven shaft. There is no actual contact between the driving and the driven halves, which are both provided with radial vanes, and the power is transmitted across the gap, $\frac{1}{8}$-$\frac{1}{4}$-in. wide, from one to the other by the kinetic energy of the oil, that is the impeller acting as a pump discharges the oil against the vanes of the runner and drives it like a turbine. Any variation in speed can be given to an infinite degree merely by varying the amount of the oil in the coupling, that is the motor always runs at a constant speed but the fan varies according to the alteration of the content of the oil which is supplied from a small overhead tank, easily adjusted in amount with great accuracy by a movable weir device in the tank.

Included in the advantages, apart from the infinitely variable speed range, are that the robust squirrel cage A.-C. motor can be used with a simple form of starting gear, the fan being protected against the stresses of rapid acceleration due to " kick " starting because the motor comes into action first and the fan does not commence to run at speed until sufficient oil is in the coupling.

Further, the fans can be varied directly in speed without throttling by means of dampers, which means a considerable saving in power as well as reduced wear and tear and erosion of the fan wheel and casing.

Although this invention was only placed on the market several years ago, equipment representing over 40,000 h.p. is either built or building for fans alone, and amongst the latest super-power stations equipped in England are Ironbridge, near Shrewsbury and Dunston B. Newcastle-on-Tyne.

The Sugar Industry in Kwangtung

(Continued from page 276)

2.—The increased tariff on sugar is shifting sugar refining into Chinese territory, and stimulating consideration of increasing local sugar cane and cane sugar production.

3.—The previous large muscovado sugar industry of China has seriously decreased, an important contributing factor being lack of security for person and property.

4.—The present character of the agriculture and kinds of cane are not of such a sort as to warrant the establishment of any large scale milling of sugar cane.

5.—Any extensive development of the industry beyond what adequate security can give, will have to be based on better sugar cane agronomy, better varieties, intensified fertilization and disease control.

The Japanese Government Railways

(Continued from page 278)

vehicles run on six-wheel bogies, in addition to 14 service cars. Sleeping saloons total just over 200, and dining-cars 112 ; postal vans number 370, steam rail-cars 14, and petrol rail-cars 12. In the wagon stock list the most unusual vehicle is a live fish van, probably the only vehicle of its kind outside of Europe. The snow danger in Nippon is well shown by the necessity of 125 snow-ploughs, which in the severe winter of 1930-31 made a mileage of no less than 222,000.

Ancillary businesses are the hotels, and the steamer services between the main island and Hokkaido, Kyushu, Shikoku, and Karafuto, and a route from Shimonoseki to the Asiatic mainland. Roughly seven million passengers and 2½ million tons of goods are carried over water in a year, the receipts and expenses for 1931-32 being respectively Y.10,795,946 and Y.5,501,547. The larger ships are ice-breakers, and there are a number of wagon-ferries in operation.

Among the most amusing of the Railways' expenditure items is the Y.27,440, which keeps up the Secret Service, but even sleuths can economize, for this figure is Y.560 less than in 1930-31, and Y.12,560 less than in 1929-30.

A Remote Lighting Plant in China, Near Tibet*

FAR away in the interior of China, in the province of Szechuen, 200 miles east from Tibet, a little hydro-electric plant is providing light to Tachienlu, thanks to the enterprise of the Mai Ming Electric Light Company. Here there has been installed a 25 kw. generator driven by a 33.8 h.p. water turbine.

Interest in the plant, it will be seen is not the interest that centers about a mammoth undertaking. There is no dam of record-breaking size, there are no long transmission lines at high voltage or widespread distribution network—just one generator, supplied from stock by Messrs. Andersen, Meyer & Company, Shanghai, as agents for the General Electric Company, and one turbine (of make unknown to us), furnished by the same vendor company.

The maximum output, 25 kilowatts, suggests a small community, but that may be misleading, for many a large plant has had a small beginning and grown with community demand. Interest there is, however, in this plant and it lies chiefly in the patience and unusual effort exercised between the date of purchase, which was in 1930, and the first turning on of the lights that was celebrated in May, 1932.

We believe we may disclose without a breach of confidence certain letters that, although not intended for publication, make interesting reading and they, together with a story contributed from Tachienlu to the *North-China Daily News* of Shanghai, are herewith presented :

From the owner to Andersen, Meyer & Co. :

"On February 13, we received your letter asking for the whereabouts of your fitter, Chen Yuan-ching. In reply we beg to inform you that Mr. Chen arrived at Tachienlu on the third day of the fifth moon last year, and immediate steps were then taken by us to select a suitable site for our building, the construction of which was only completed in the 12th moon.

"Owing to the fact that the whole shipment of machinery had to be carried from Yochow to Tachienlu by labor, and that there are altogether eight stages in the way between that place and Tachienlu, great difficulties have to be encountered in transportation for all the places are in difficult country, particularly in the winter months when the mountains lying on the journey are covered up with snow.

"After your fitter arrived at Tachienlu, we had to send him back to Yochow for unpacking the boxes to enable the coolies to carry the machinery in pieces. On the 10th day of the first moon, we started the work of transporting the machines from Yochow, and as it would take about one month for the machinery to arrive at Tachienlu, we expected that the installation of our plant would be completed in the second moon. Owing, however, to the non-arrival of the weatherproof wires, there is every likelihood that we will not be able to start operation of our plant at the time mentioned above, and therefore we have urged your fitter to stay here for two months more."

Mr. Chen, sent by Andersen, Meyer & Company to install the plant, writes to his employers :

"Before I left Shanghai for Szechuen for the installation of a lighting plant, I was told that I might return in three months. Unexpectedly, on account of the loss of a shipment of electrical materials during transit, I only left Chungking in December, 1930 and arrived at Tachienlu on May 3, 1931.

"Upon my arrival at Tachienlu, I found that the building construction work was just started and owing to shortage of material and labor, six months have now elapsed and yet the work has not been completed. So far, the machines have only arrived at Yochow, which lies at a distance of eight stages, 80 miles, from Tachienlu. Means of communication are very poor, besides the packages of machinery have to be carried by coolies over two mountains just lying on the way.

"At the request of the partners of our customer, I came back to Yochow to open the packages in order to facilitate the transportation work. It is estimated that the machinery will only arrive at Tachienlu in the middle of the 12th moon and that I would only be able to return to Shanghai in the first moon, even if the installation work is done immediately."

The appreciation of the owner of the plant upon its completion was expressed in the following letter to Andersen, Meyer & Company :

"Our lighting plant complete has now been properly installed by your fitter, Mr. Chen Yuan-ching, who has now decided to return to Shanghai on the sixth instant.

"We have the greatest pleasure to advise that the result of testing operations of the whole hydraulic lighting plant is very satisfactory. This shows that the turbine and generator are both of the best manufacture and their quality cannot be surpassed. Their special features are high efficiency and easy operation.

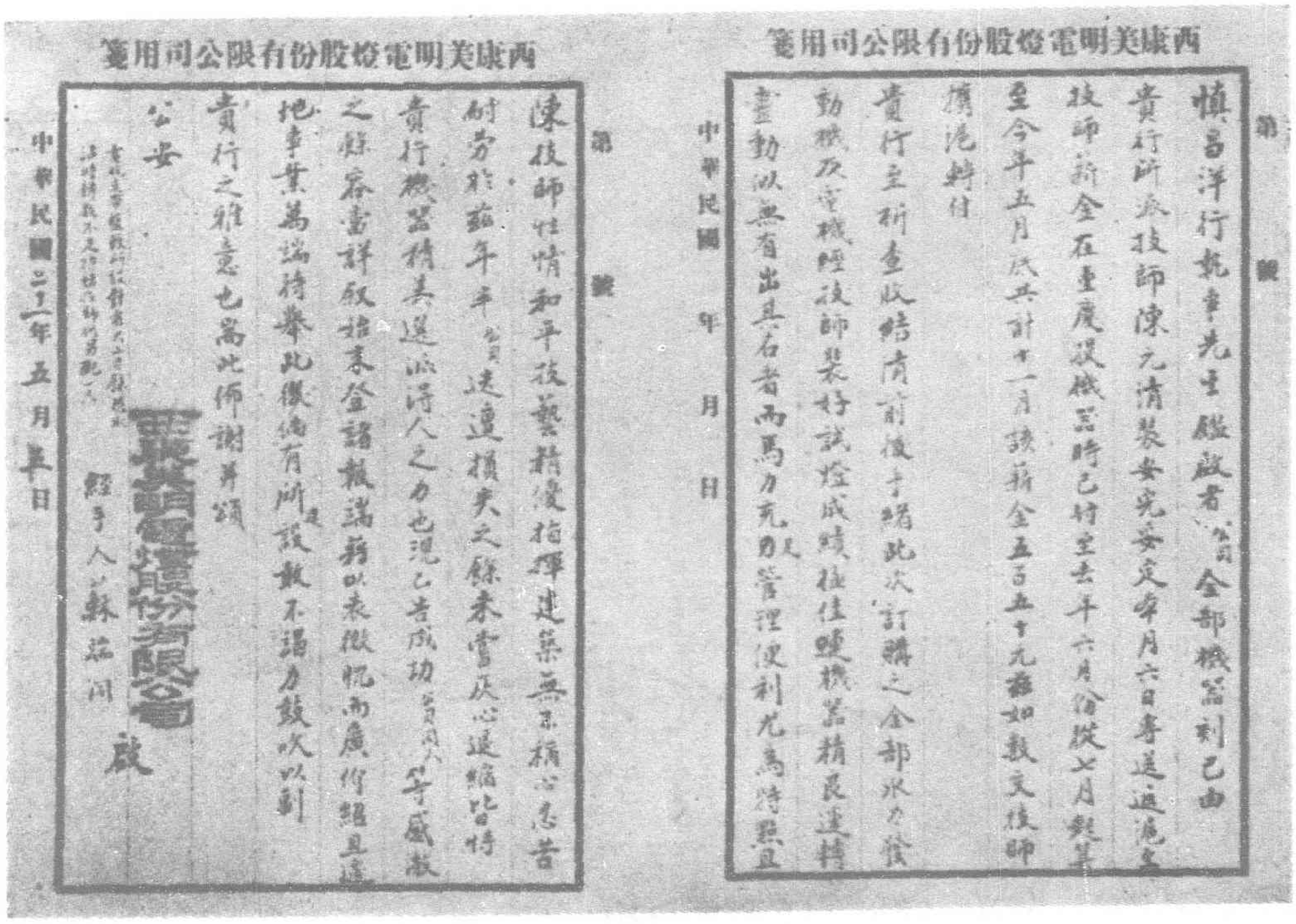
"Besides, we are quite satisfied with the skill of your fitter who is a quiet worker and has spared no pains in giving directions in the installation of the plant. In fact, it is due to the good quality of your machines and the right man you sent here for the work that we did not feel disheartened in spite of the repeated losses we have suffered. Now that we have succeeded in carrying out our project, we beg to convey to you our sincere thanks for your coöperation."

From a letter to the "China Daily News", Shanghai, dated Tachienlu, May 12, 1932 :

"A few days ago Tachienlu tried out its electric light and found it satisfactory. It was a great night in Tachienlu. Huge crowds flocked to the power station to watch the lights function for the first time. It was a time of anxiety and excitement for those responsible for the scheme, but everything went splendidly ; a faint glimmer and a blaze of light. Electric light in the border town was now an accomplished fact.

"Getting this power plant on to the frontier was no easy task. It took 16 coolies nearly two months to carry one piece of machinery the 80 miles between Yochow and this city. Eight men struggled along the narrow precipitous roads with another part, occupying almost the same amount of time. The road at places is simply a narrow path along the side of the cliff with a rushing torrent away below. How these Chinese coolies managed to do it successfully, will always remain a wonder.

(Continued on page 287)



西康美明電燈股份有限公司用箋

中華民國　年　月　日

西康美明電燈股份有限公司用箋

中華民國二十一年五月十日

Two-page Letter of Appreciation from the Plant Owner

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*The Digest

Pulverized Fuel Installation of the S.S. "Johore Maru" and S.S. "Nagoya Maru"

The First Japanese Passenger Liners Installed with Clarke, Chapman's System

By Y. TAJI, M.Eng., M.I.N.A., M.I.Mar.E.

THE superiority of Clarke, Chapman's pulverized fuel system has been well approved by many British, French and German shipowners, whilst very recently two Japanese passenger liners *Johore Maru* and *Nagoya Maru* of Messrs. Ishiwara Industrial and Transport Co., Ltd., have been equipped with this system to play a further rôle in the development of this type of pulverized fuel installation. These vessels are the first passenger liners in the world designed solely for pulverized fuel burning.

Each pulverized fuel installation of these ships comprises three sets of Clarke, Chapman's "Resolutor" pulverizers, each with a capacity of 2,240 lb. per hour at 1,450 r.p.m. driven by a Bellis and Morcom high speed steam engine of 30-40 b.h.p. with a cylinder bore of 7-ins. and a stroke 2½-ins. at a working steam pressure 150 lb. per sq. in. and a back pressure 10 lb. per sq. in.; one set of 7 h.p. coal crusher with a capacity of 10 tons per hour; two sets of coal elevators (one set only in the *Nagoya Maru*), each with a capacity of 10 tons per hour driven by a 7 h.p. steam engine; nine Woodeson's patent short flame burners fitted to furnace fronts; a number of powdered fuel distributors; three primary air fans fitted after the mills; one Woodeson's ash ejector; nine Diamond soot blowers, etc.

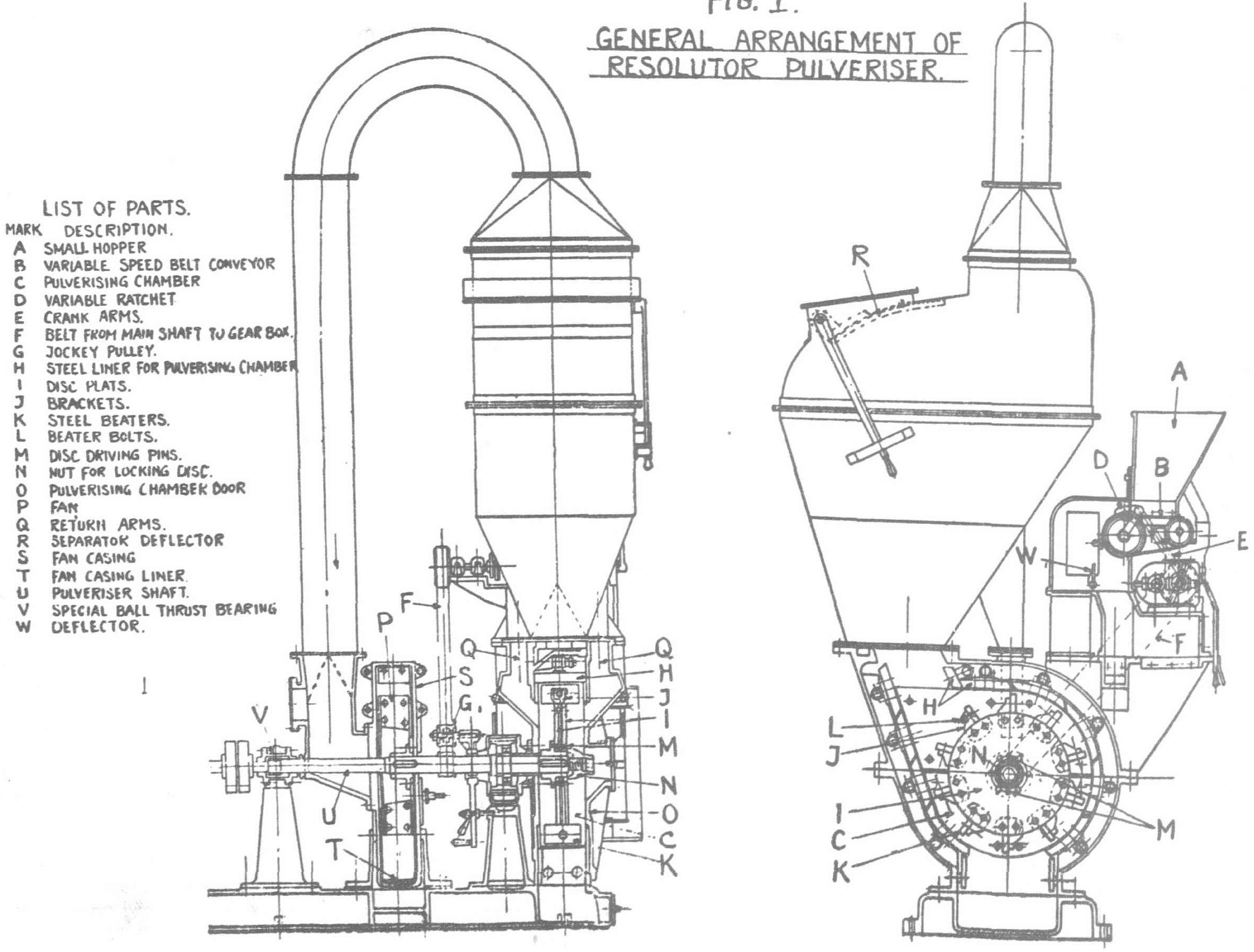
The main boilers are six in number, each being of marine Scotch type with a diameter of 15-ft. 9-in., a length of 12-ft. 9-in. (the *Nagoya Maru's* 12-ft. 6-in.), three furnaces of 48-in. in diameter, a total heating surface of 3,094 sq. ft., fitted with a tubular air heater and a Ferguson's superheater of 800 sq. ft., superheated at 100 degrees Fah.

The main engine of the *Johore Maru* is one set of triple expansion reciprocating engine with a h.p. cylinder of 26-in. bore, an i.p. cylinder of 44-in., a l.p. cylinder of 74-in. and a stroke of 51-in. with a normal output of 4,000 i.h.p. at 75 r.p.m., whilst that of the *Nagoya Maru* has diameters, 25½-in. h.p., 41½-in. i.p., 69-in. l.p. and a stroke of 51-in. with a normal output of 3,800 i.h.p. at 78 r.p.m. Both are fitted with a Bauer-Wach's exhaust steam turbine.

In Fig. 1, coal lifted to the crushed coal bunker by the elevator (see the boiler room arrangement of the *Johore Maru* in the —issue of *The Shipbuilder and Marine Engine-Builder*, 1933) falls to a hopper A under gravity and through conveyor belt B to the central part of the pulverizing chamber, the feeding quantity being regulated by the speed of the conveyor belt and the opening of a door at lower part of the hopper. The motion of the conveyor belt is effected by a roller worked by a ratchet D through

FIG. 1.

GENERAL ARRANGEMENT OF RESOLUTOR PULVERISER.



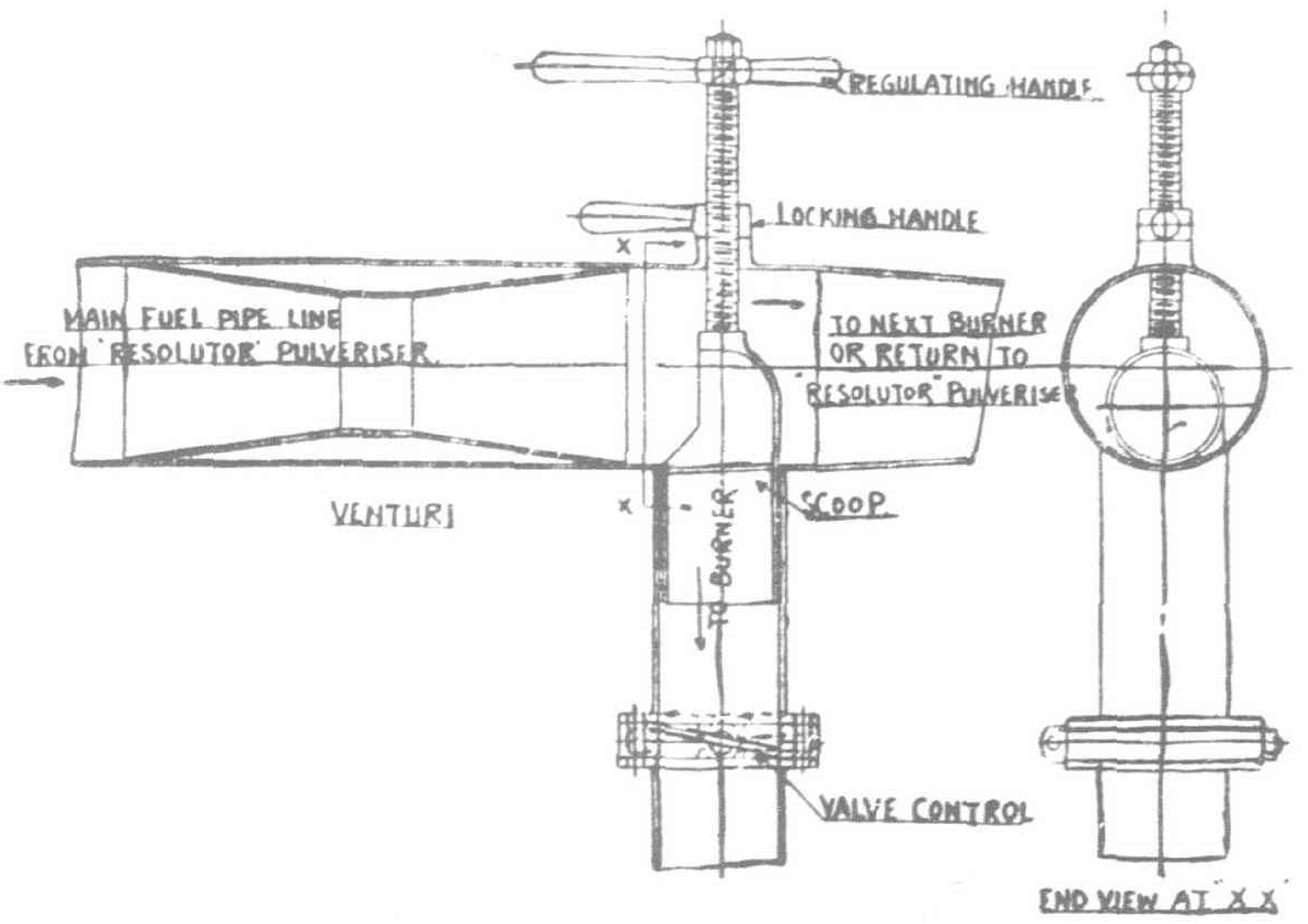

REGULATING HANDLE
LOCKING HANDLE
X
MAIN FUEL PIPE LINE FROM 'RESOLUTOR' PULVERISER
TO NEXT BURNER OR RETURN TO 'RESOLUTOR' PULVERISER
VENTURI
X
TO BURNER
SCOOP
VALVE CONTROL
END VIEW AT 'X X'

Fig. 3.—Powdered Fuel Distributing Valve

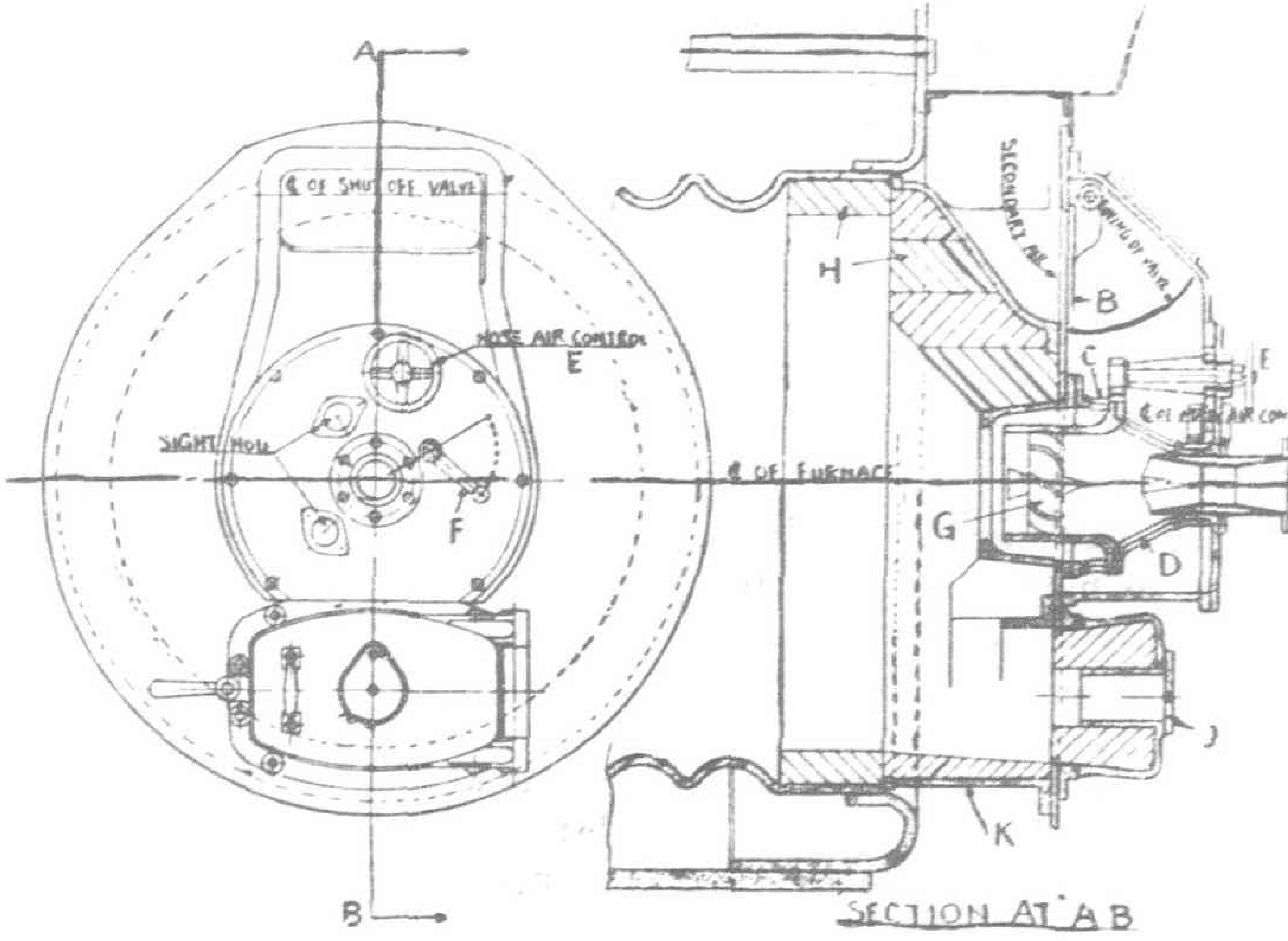


Fig. 4.—"Woodeson" Patent Short Flame Burner

a crank arm E operated by a belt from the main shaft U, the speed of the belt being freely regulated by altering the stroke of the crank arm E. Coal is pulverized by beaters K and proceeds upwards from space below the conveyor belt, then it is mixed with primary hot air at about 300°F and thrown up into the separator and drying itself is drawn by a fan P and is fed to the boilers through the main feed piping. Coarse powder returns again to the pulverizer through Q by means of a deflector R. The fineness of the powder can be adjusted by lifting or lowering the deflector. In case metal is mixed with coal, it falls down into the bottom pocket and by noise caused it can be taken out through a hand hole.

The beaters K and liners H are of special steel, the fan P and liner T are of spring steel, whilst the casing is of cast iron and the separator is of steel plate. The standard revolution of the beaters is 1,450 per minute. The length, height and width of the pulverizer are 9-ft. 6-in., 14-ft. 0-in. and 7-ft. 0-in., respectively.

The powdered fuel distributing valves are of special design as shewn in Fig. 3. One distributing valve is fitted to each furnace. The regulation of fuel quantity is effected by moving the scoop by a handle while inspecting the burning condition through peep holes fitted to the furnace front and boiler end plate, thus the operation is very simple. At the beginning of firing the boiler, the manual regulation is necessary, but when the combustion is settled, further manoeuvering is unnecessary. Excess fuel returns to the fan suction through a ring-main circulating system.

The burners are of Woodeson's patent short flame type, the construction being shewn in Fig. 4. Powdered fuel is injected parallel to the center line of the furnace through a tube A. In the older type, it was injected from an upper position at a certain angle, but it was confirmed that the effect is unsatisfactory. Secondary air at about 250°F. enters into the register through a hinge valve B and a slot C operated by means of a nose air controller E, and air entered from the main controller F produces a turbulent motion to the fuel through diffuser G; thus complete mixture being produced, the combustion starts quickly with a short flame. Areas of the air openings at C and D are in a ratio of about 1 to 3. The length of flame is about 6-8 feet, and the results have been recognized as very satisfactory. Further, the diffuser G can be shifted in the fore and aft direction in accordance with the kind of coal used. H is fire-resisting brick and J is a peep hole, whilst the furnace front K is of cast iron.

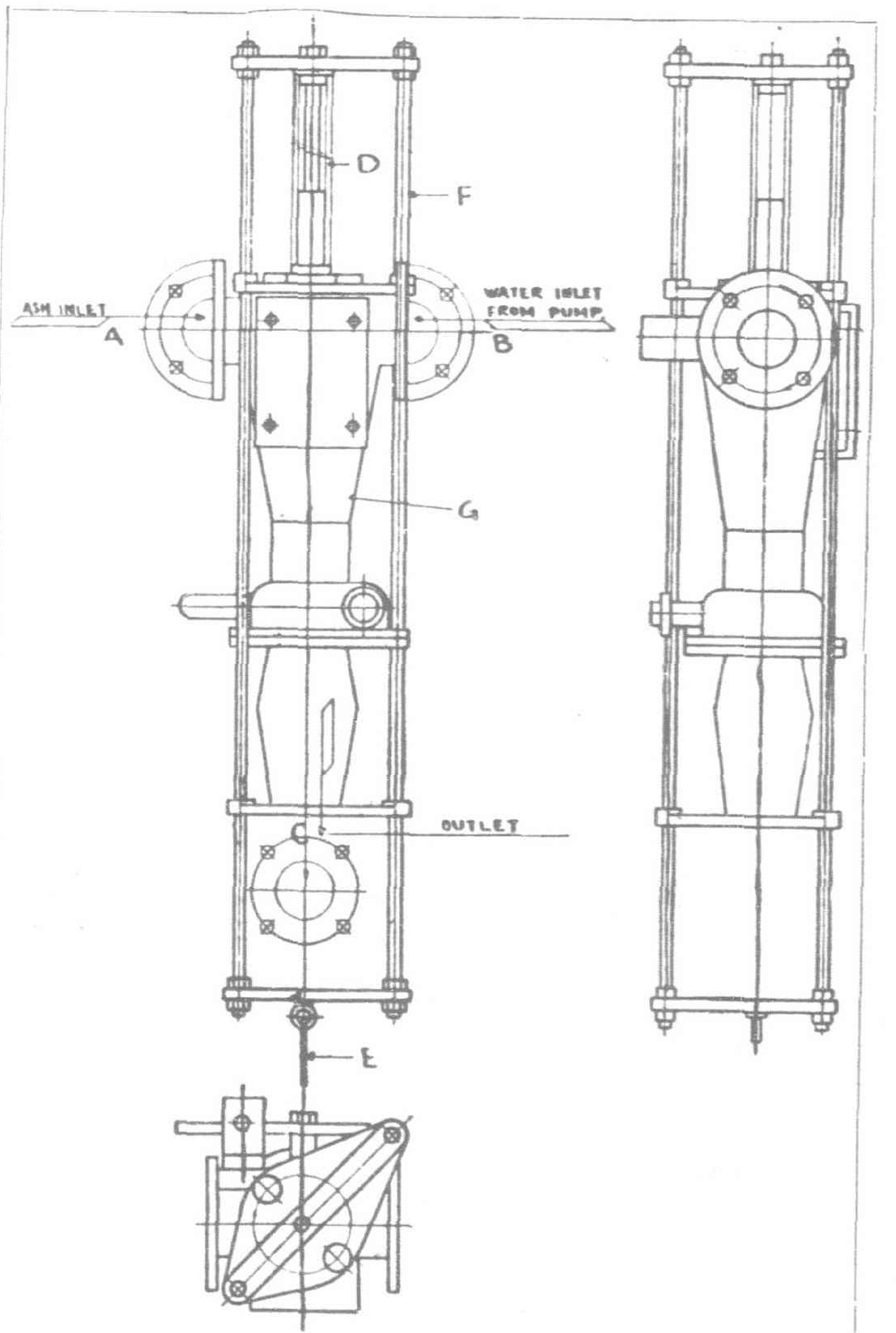


Fig. 5.—"Woodeson" Ash Ejector

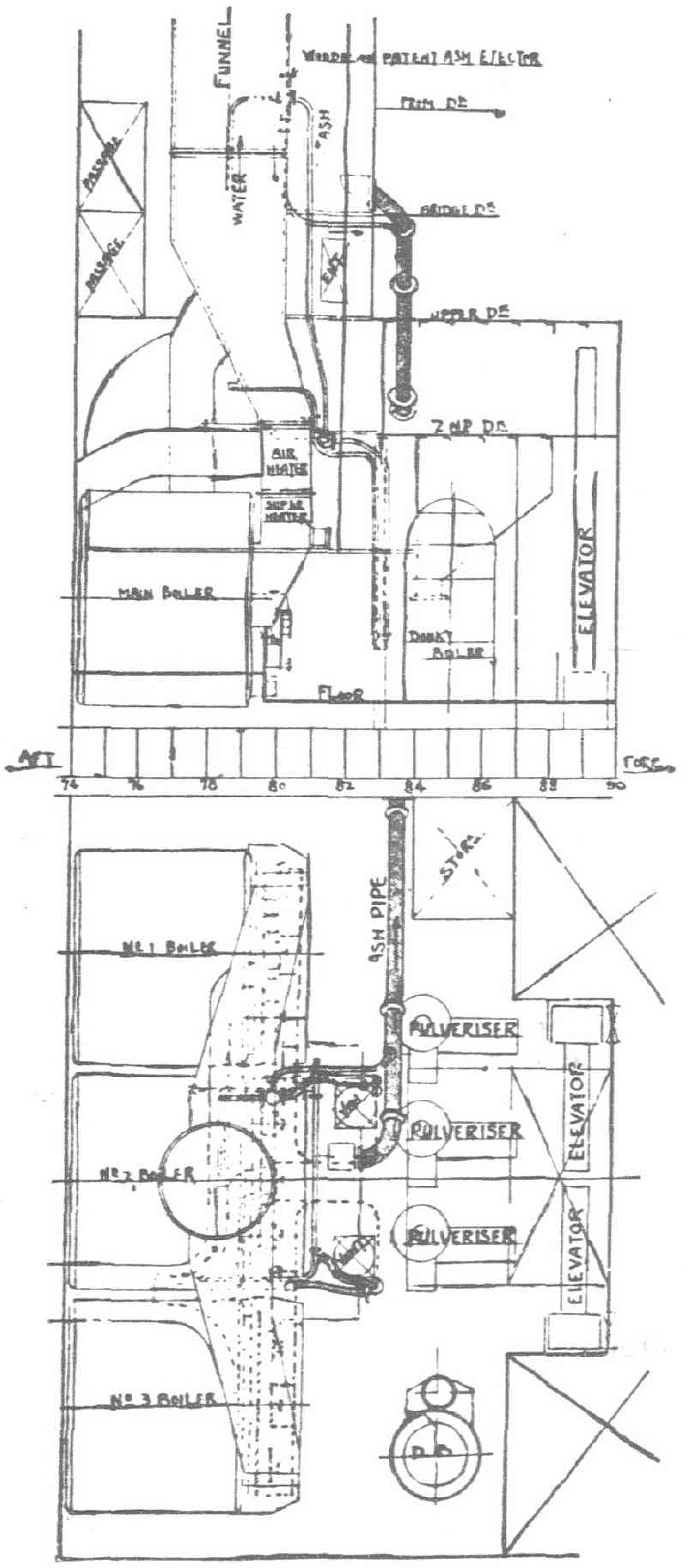
The ash ejecting arrangement is shown in Fig. 7, in which a Woodeson's ash ejector is fitted for sweeping ash in smoke boxes and at bottom of chimney, and its construction is shewn in Fig. 5 in which sea water is delivered from B through a bilge pump or a general service pump. By means of a special ejector action at G, ash is sucked from A and discharged overboard through C. Cleaning of the ejector is effected by pulling a rope E which operates connecting rods F and spring D, but this appears to leave some opening for improvement.

Fig. 6 shews an ash pocket to draw ash deposited in smoke box by the ejector, four pockets being fitted to a boiler with three furnaces. Ash piled up in pocket C is connected to the ejector through a flexible hose. It is reported, however, a further improvement is desirable for this arrangement.

The arrangement of superheater and air preheater is shewn in Fig. 8.

In firing the boiler, the furnaces are heated first by burning wood, and shutting the secondary air valves of furnaces, the fan is driven very slowly, whilst the pulverizer is rotating idly and the distributing valves are suitably open. Then, the fuel feeding devices of the pulverizer are operated and powdered fuel injected to the furnaces is lit by burning rag soaked with petroleum or by a paraffin torch. In this case, an ample quantity of powdered fuel is injected in order to have uninterrupted flame and at the same time the secondary air valves are slightly open. Further increase of the fan revolution and air pressure will effect complete combustion in steady condition.

In case of refiring after stop, the injection of powdered fuel only is sufficient for the combustion, so



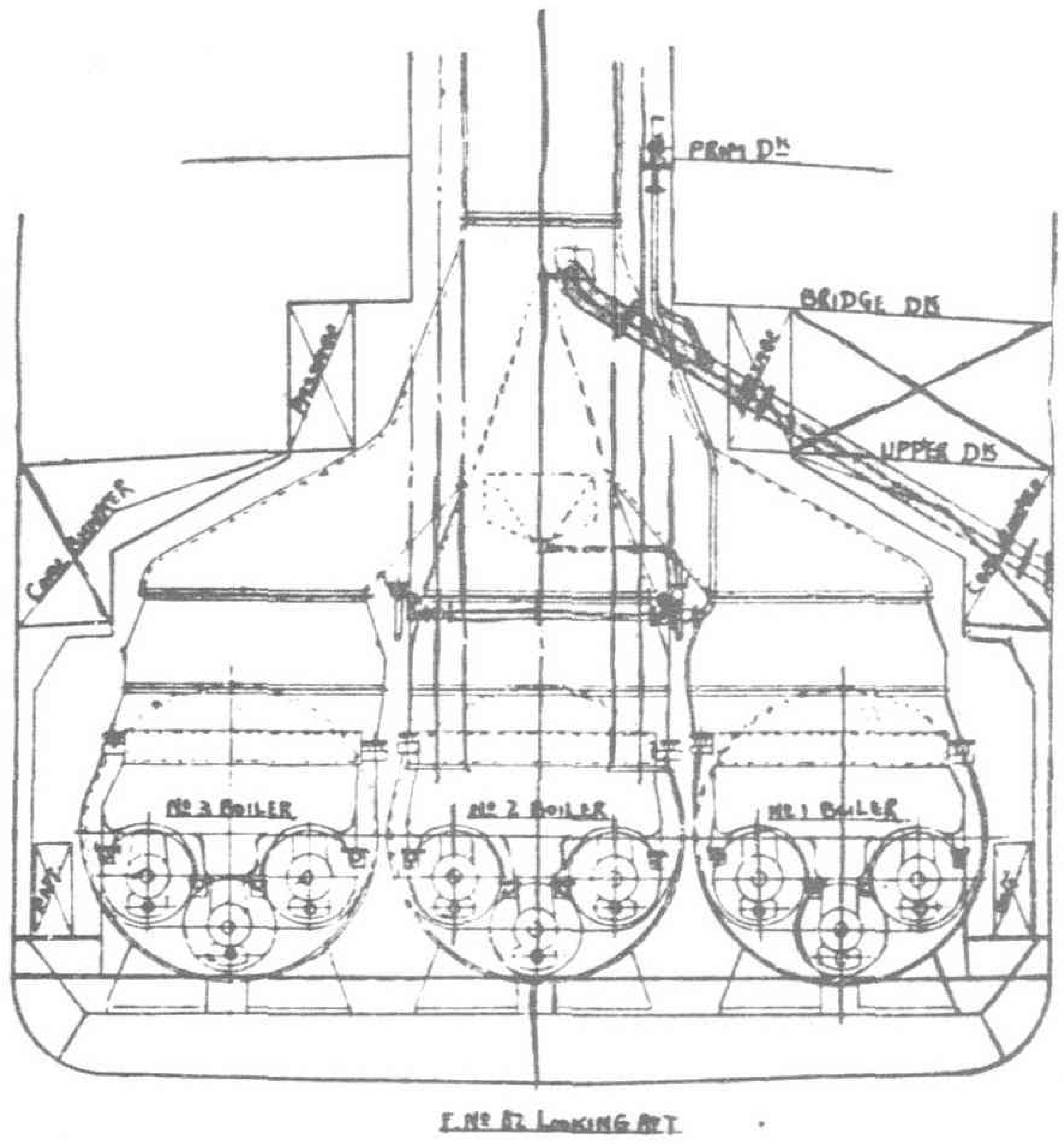


Fig. 7.—Arrangement of Ash Ejector System

far as the fire bricks are still at a high temperature.

In stopping the fire, the feeding of fuel is stopped and the pulverizer is driven idle for about one minute until no powdered fuel remains in the machine chamber and then the machine is stopped. Then, the primary and secondary air is shut off. The pulverizer should not be stopped with full powdered fuel in it, but if it happens, the powdered fuel is scraped out through the bottom door in order to make the beaters runable freely.

Slags are taken away before stopping fire and the ash scraping is carried out every eight hours, whilst the soot blowers are used every four to six hours. The adjustment of fineness of powdered fuel is not necessary, if once adjusted, but in case of need it can be regulated finer by lifting the deflecter of separator and coaser by lowering it.

Secondary air should be used in all conditions, so far as practicable, except the first firing; if the combustion continues without secondary air, the burner deflector is apt to be damaged.

The whole installation of both the *Johore Maru* and *Nagoya Maru* has given entire satisfaction to both the shipbuilders and owners in various official trials, and the following is the results for fuel consumption :—

	Johore Maru	*Nagoya Maru*
Displacement, tons ..	8,251	8,168
I.H.P...	4,228	3,592
Coal consumption, in lb per i.h.p. per hour	1,221	1,258

After careful consideration, the writer as the first strong advocater of the pulverized fuel system in Japan,* confirms a saving of coal by some 15-20 per cent over ordinary hand firing, the combustibility of very poor coal which is difficult to deal with under hand firing, a

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*See *Journal of Society of Naval Architects of Japan*, Vol. 43, 1928 "Application of Pulverized Fuel for Marine Boilers" by Y. Taji

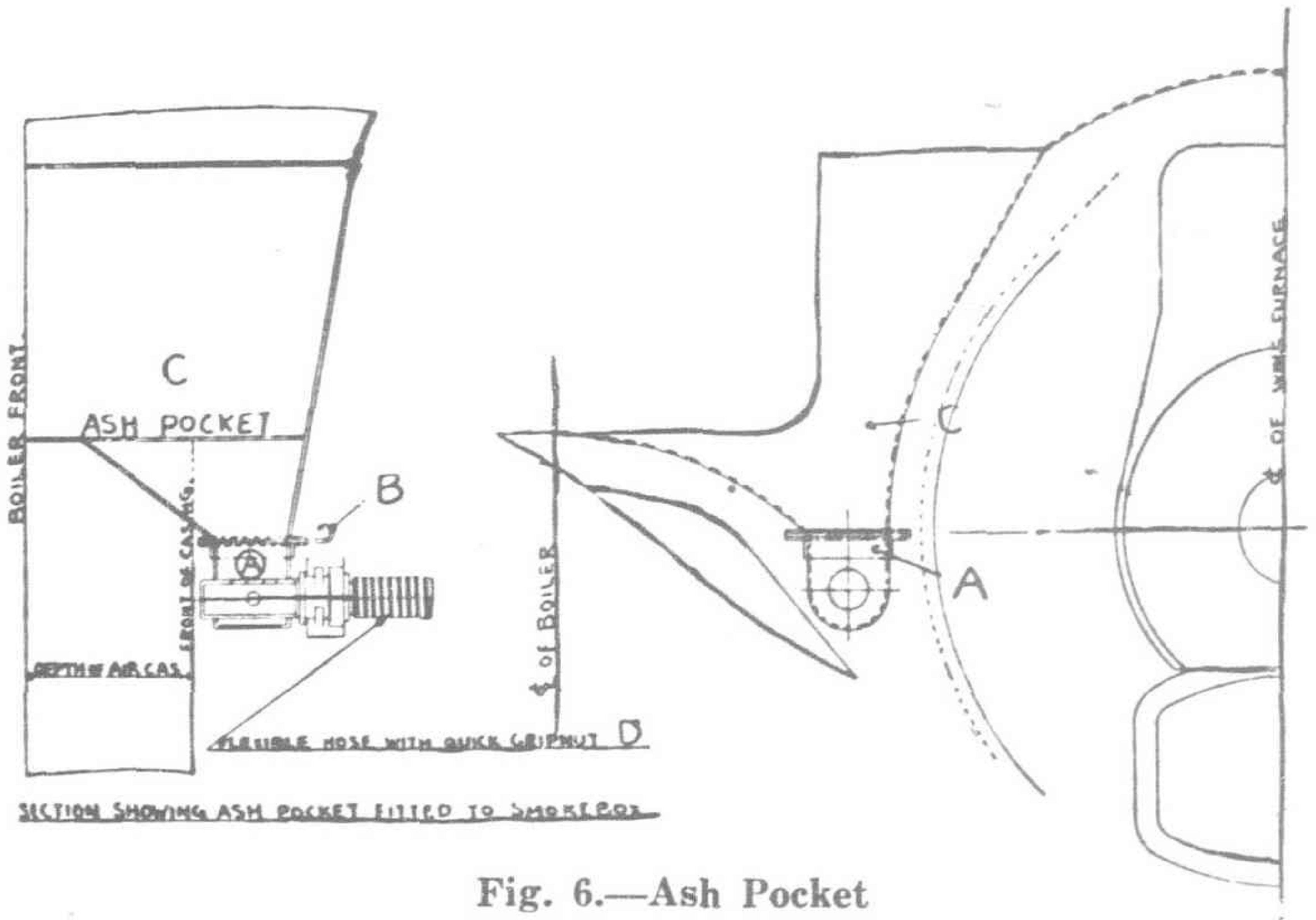


Fig. 6.—Ash Pocket

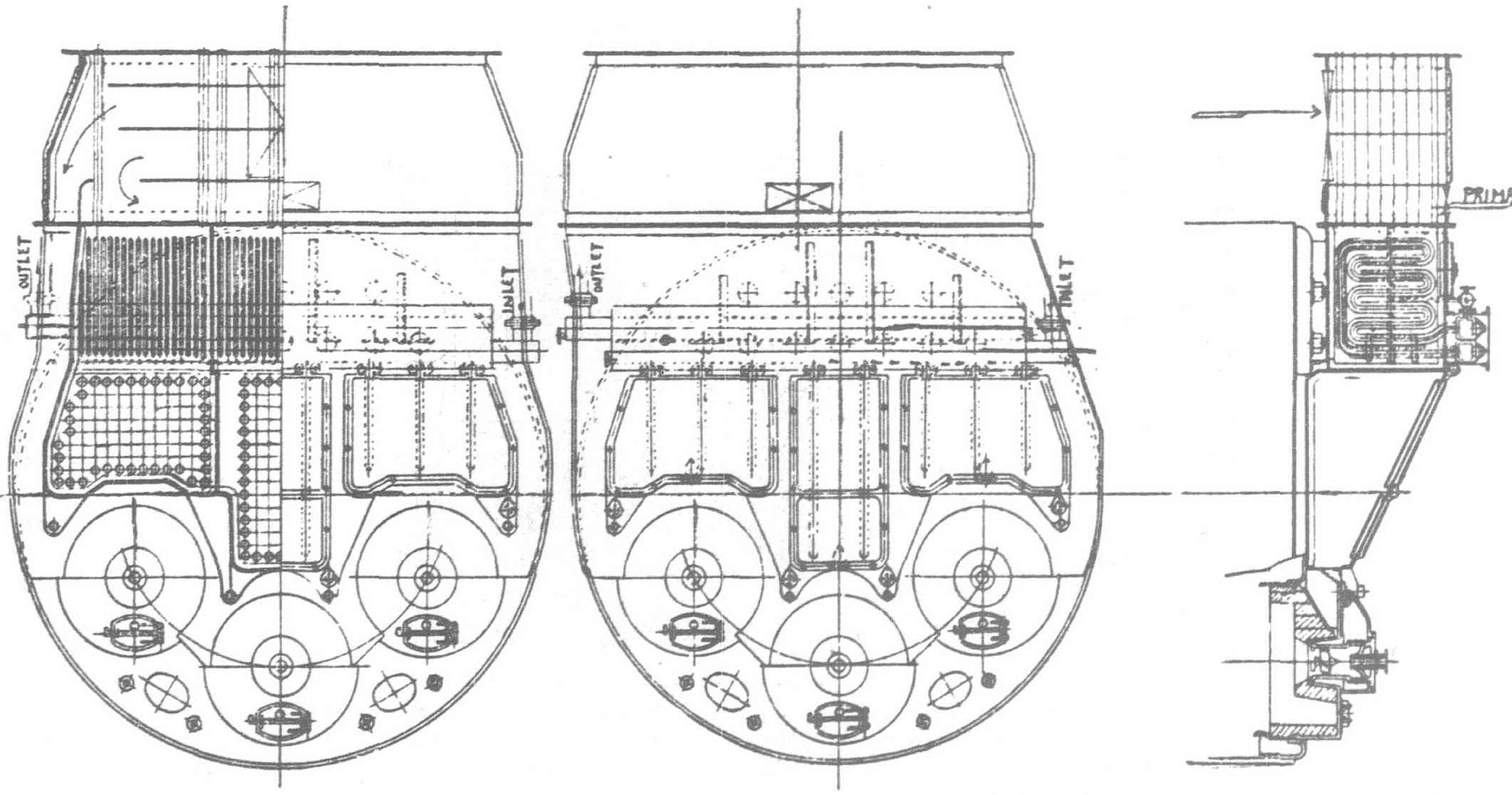


Fig. 8.—Arrangement of Superheater and Air Heater

considerable saving in labor in boiler room staff, the easy and speedy adjustment of fire against the fluctuation of load, the easy starting and stopping of fire which unnecessitates burying fire, a small capacity of fan owing to a small excess quantity of air, the complete combustion with very light yellow smoke almost colorless—except at the beginning of firing, etc.

A slight trouble in falling of fine particles of ash from the funnel on deck has been experienced in these ships, but this is not at all a serious matter in cargo vessels and even in these passenger steamers a higher funnel or adoption of a suitably designed deflector at the top of the funnel can easily overcome this minor trouble.

Further, the writer trusts that after a long run the boilers will show a longer life owing to no entrance of cold air to the furnaces due to the lack of necessity of opening the furnace fronts for firing, whilst the uniform steam pressure and consequent steady speed of the ships will reduce days of navigation.

As to the disadvantages of the pulverized fuel burning plant, an increase of machinery weight by some 5 per cent and an extension in some parts of the boiler room by about 5 to 9 feet have been taken into account. The writer, however, believes that these disadvantages will be cancelled with the reduction of fuel quantity to be carried and the consequent reduction of bunker capacity and space, whilst in new ships a certain reduction of the tonnage can even be expected.

There is, however, still ample scope for the further development and improvement of the existing systems, particularly in dealing with ash in boiler, etc., and the writer hopes the builders and engineers will put forth their best endeavors for further improvements.

A Remote Lighting Plant in China, Near Tibet

(Continued from page 283)

" When climbing the stiff passes, the whole 16 men were around the dynamo like gamblers around the dice and when on a narrow ledge, the men were stretched out in a single file. The adjustment of the carrying apparatus was most ingenious. In some places the road had completely disappeared, being washed away by the undercurrent of water ; in other places precarious bridges had to be carefully manipulated. Two very steep passes had to be crossed, heavily covered with snow and ice.

" At present the city is not completely lighted through some mistake in the reordering of material thrown into the Yangtze. When the steamer carrying the electric plant for Tachienlu ran on a sand bank above Hankow the machinery was thrown into the river, because bandits hanging around threatened to attack the ship. When the new order started again from Shanghai, it was not discovered till the boxes arrived here, that there was not enough wire to go around the town. A Tachienlu musk merchant, interested in the lighting of the city, arrived with his musk in Shanghai some time in January. His plan was to sell the musk and secure the necessary additional wire but civilized Shanghai became too dangerous for the merchant, so without the wire, he beat a hasty retreat to safety in the wild borders of Tibet.

" When the city is completely lighted, the populace—Chinese and Tibetans, ought to be very grateful to those who have put through this most difficult undertaking."

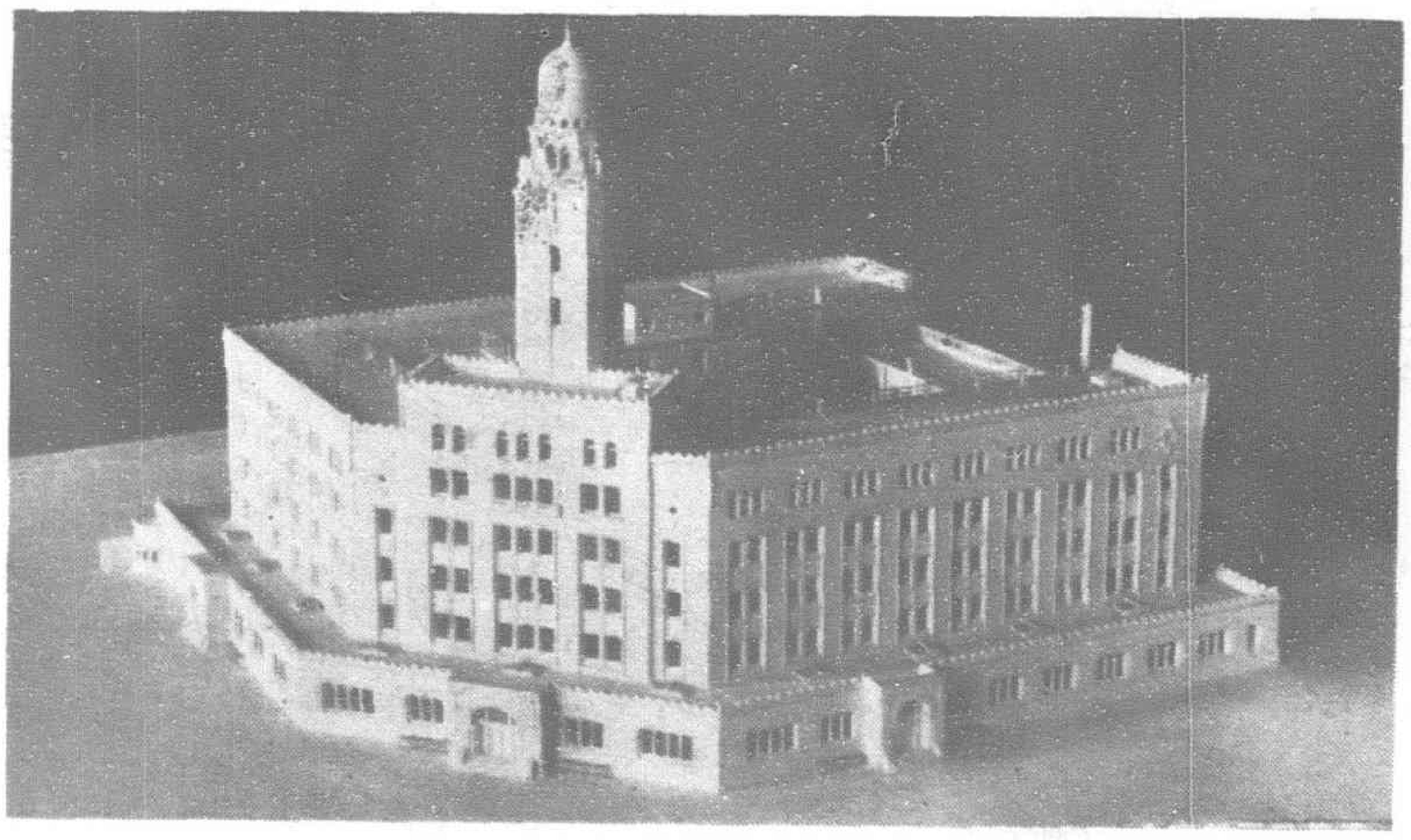
Railway Schemes in Shansi

There is talk of an early start being made in railway enterprise in Shansi province, China, and apparently it has been decided to make the Tung Pu line of meter gauge to avoid transhipment of goods coming in on the Chengtai line, and to use rails having a weight of 35 lb. per yard, approximately. On purely theoretical grounds a good deal of criticism has been directed against the proposal, but there can be no doubt that a line of 2-ft. 6-in. gauge running north and south would meet all traffic requirements for many years. Consequently the sponsors of the project consider it unreasonable to deprive the province of a much-needed line until it is in a financial position to construct one of standard gauge. Such a line would give a large saving in capital cost over one of standard gauge, due to the small radius curves and flexibility of alignment obtainable, and which would enable it to follow land contours, thereby avoiding heavy embankments and deep cuttings. Earthwork would be largely half excavation and half embankment, and much lighter bridges could be used. The proportion between dead and paying loads also favors the light railway. The decision to use the meter gauge will result in the new line linking up with the Chengtai line which runs into the center of the province. Marshal Yen is also contemplating the setting up of furnaces and rolling mills for the production of steel rails from Shansi ores.

Yokohama's New Customs House

For several years past, adequate facilities for customs house accommodations at Yokohama have been needed to replace temporary quarters put up hastily subsequent to the 1923 earthquake, which laid waste this important port city of Japan. It was only recently that the Ministry for Home Affairs of the Japanese government, by providing the necessary appropriations, made it possible to erect an appropriate office structure for a new Yokohama Customs House.

Including the foundation, the building now under construction will cost approximately Y.1,171,596, cover a ground area of 6,875 sq. meters and have a floor space of 12,183 sq. meters for its five stories reaching 22.36 meters from the level of the ground to the parapet, the Imperial Finance Department reports. Topped by a turreted, dome-crested tower superimposed over the building's forepart, the entire structure will rise to a total height of 51 meters above the sidewalk.



Model view of new Customs House now under construction for Port of Yokohama at total cost of Y1,171,596 for building and foundation. Work began September, 1932 and completion scheduled by March, 1934. Builders, Todan-Gumi, Ltd.

In an effort to have the new customs offices ready for occupancy according to schedule by March, 1934, the contracting firm of Todan-Gumi, Ltd. has made steady headway with the building itself, which was begun in January of this year. Plans designed at the Government Architectural Bureau in Tokyo are being followed. In December, 1932, work on the concrete-pile foundation, for which ground was broken three months previously in September, had been completed. This foundation alone cost Y.48,096.

Ferro-concrete, earthquake resisting construction is being employed throughout the new Yokohama Customs House. Heavy framework of structural Yawata steel encased by reinforced concrete will be covered with white facing brick when the building is finished.

Engineering Notes

COMMUNICATIONS

INDO-JAPAN WIRELESS—An important step forward in international communications was taken up by the inauguration of a direct beam wireless service between India and Japan, which will result in speedier and cheaper communication between this country and the Far East.

MACAO TELEPHONES—The Director of Posts at Macao, the Portuguese island near Hongkong, has decided to link Macao with Taipa and Coloane by telephone. The laying of the cables will be in charge of the Public Works Department. A scheme for linking Macao with Hongkong and Canton by radio-telephone is also under consideration.

PHILIPPINES-BERLIN—Direct wireless telephone service between the Philippines and Berlin as well as indirectly with Paris was inaugurated recently when the big wireless station at Nauen, near Berlin, succeeded in taking a telephone call from Manila and in relaying it to Paris. The charges for a three minutes' conversation between Manila and Paris will be F.800.

RADIO BEACONS FOR CHINA.—Following the successful operation of the Marconi automatic wireless beacon station which was installed in 1930 at North Saddle Island, near Shanghai, the Chinese authorities have arranged to equip two other important navigational points with similar apparatus of the latest type. The sites of the new beacons will be at Shaweishan Island, near the mouth of the Yangtze, and Gutzlaff, also on the shipping routes to Shanghai, which will be fitted with beacons of 700 watts and 500 watts power respectively. The apparatus will be specially designed and constructed for use under tropical conditions.

HIGHWAY IN CHINA—Preliminary surveys have begun for the proposed inter-provincial highway linking Peiping with Lanchow, provincial capital of Kansu. Construction will be started in the near future as funds are already assured by an appropriation of $200,000 from the Central Government. It is learnt that the highway will be built under the direction of the China International Famine Relief Commission which has in past years successfully completed many similar projects. The highway is expected to be opened to traffic in six months.

MINING

COAL IN KIANGSI—It is reported that a newly discovered coal-bed at Pingsiang, Kiangsi province, is to be developed by the Chinese Ministry of Industry, in co-operation with the German Kondorfer interests. It is understood this coal is to be used by the State steelworks.

COAL IN MANCHURIA—Exposed coal mines have been discovered in the neighborhood of Taotoushan, some 17 miles downstream from Harbin. The discovery was made accidently by representatives of the To-a Construction Company while making a survey of stone and other building materials.

FIND RICH DEPOSITS.—Despatches from Lanchow, provincial capital of Kansu, China, tell of the discovery of rich mineral deposits at Yumen, in the north-western part of the province. Mr. Wei Chen-hua, Magistrate of Yumen, has officially reported to the Provincial Department of Reconstruction for Kansu, that naphtha oil has been found at Shihyuho, a town south-east of Yumen city, while at Hungkow and Hansia, two towns within the Yumen District, gold and coal deposits were discovered.

GOLD DISCOVERY—In the district of Ansi, Shensi province, gold has been discovered at Huang-Hua-Shih-Yen about 50 *li* from the city, which at Liu-Chia-Ta, about 40 *li* from the city, a rich silver lode has been located. Owing to the remoteness of the district and inadequate communications, mining operations have not been undertaken despite the richness of the deposits.

CHINESE TUNGSTEN—The Nanking Ministry of Industry has decided to take control of all tungsten mines and manage them as State enterprises. In view of the extensive deposits of this metal in Kiangsi, the Kiangsi Provincial Government has been specially instructed to act in conformity with the decision.

It is understood that the Ministry is planning to raise a sum of six millions for the development of the tungsten industry in Kiangsi and Honan. The program, however, is still in an embryo stage. Technical experts have been despatched to Kiangsi to investigate the possibilities of resumption of tungsten mining. Despite the rich tungsten deposits in southern Kiangsi, which are estimated to be 60 per cent of the world supply, the prevalence of "Red" banditry has arrested the development of the industry. With the clearance of large areas from the bandit scourge, however, the Ministry is planning to exploit the mines to meet the home demand and for export.

ELECTRICAL

NEW ELECTRIC WORKS.—The Shansi Provincial Government of China has decided to establish works for turning-out electrical machinery. At first the output will be limited to motors under 10 h.p., but generators and transmitters will be manufactured later should the venture prove satisfactory.

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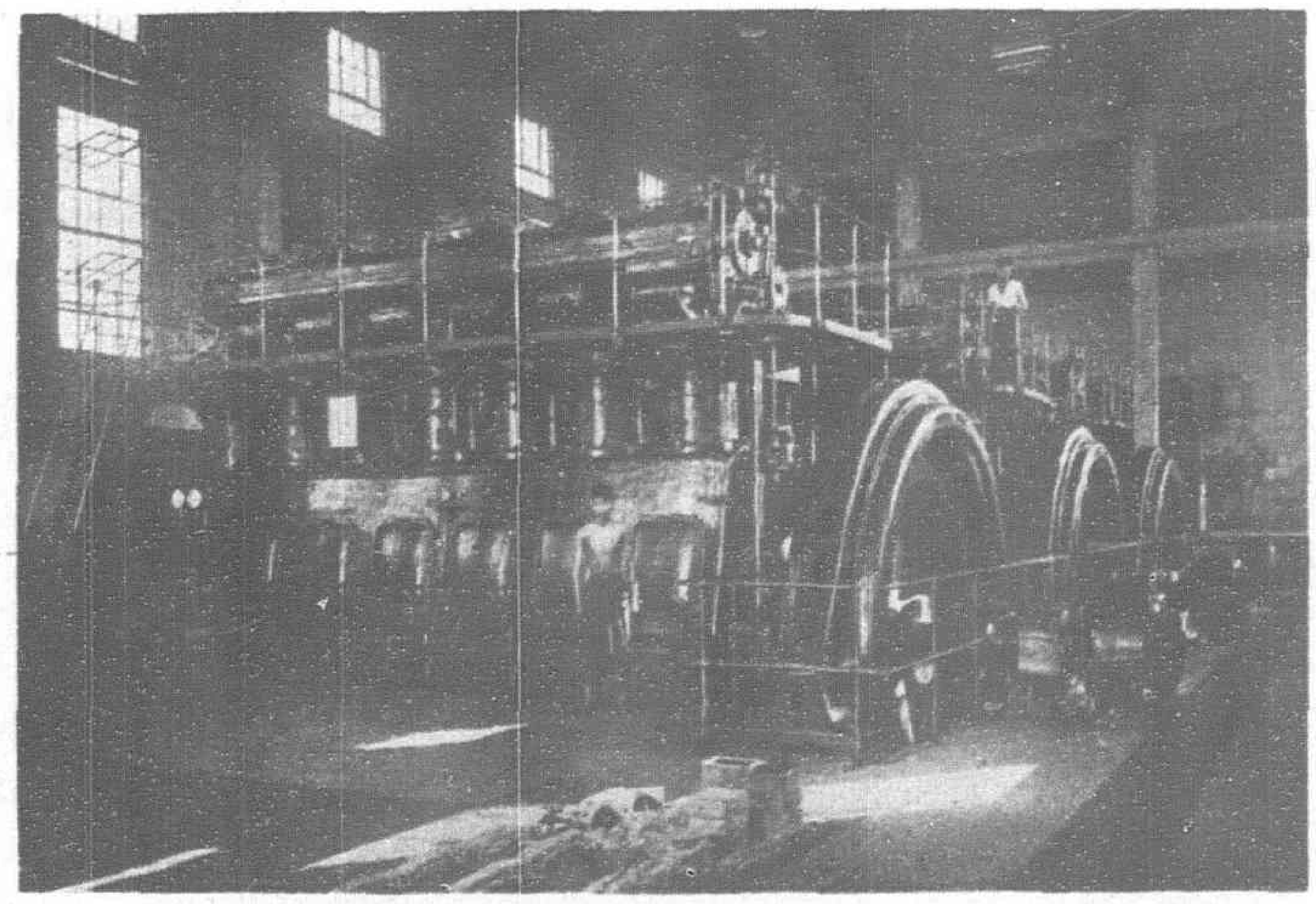

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